State of Kansas
Exceptional Event Demonstration Package
Goodland, KS
October 6, 2011

Department of Health and Environment
Division of Environment
Bureau of Air

November 7, 2013

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EXECUTIVE SUMMARY

In 2005, the Environmental Protection Agency (EPA) promulgated the Exceptional Events Rule (EER) to address exceptional events in 40 CFR Parts 50 and 51 on March 22, 2007 (72 FR 13560). On May 10, 2013, in an attempt to clarify this rule, EPA released interim guidance documents on the implementation of the EER to State, tribal and local air agencies for review. The EER allows for states and tribes to "flag" air quality monitoring data as an exceptional event and exclude those data from use in determinations with respect to exceedances or violations of the National Ambient Air Quality Standards (NAAQS), if EPA concurs with the demonstration submitted by the flagging agency.

Western Kansas, due to its geographical location and semi-arid climate conditions is more susceptible to windblown dust events. These events are occasionally captured by various air quality monitoring equipment throughout the state, sometimes resulting in exceedances of the PM_{10} (airborne particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns) NAAQS. The Kansas Department of Health and Environment (KDHE) believes that the dust event that occurred during the Fall of 2011 exemplifies these types of events. This document contains detailed information about the windblown dust event that affected the Goodland PM_{10} monitoring site on October 6, 2011. On this day, the Goodland monitor exceeded the PM_{10} NAAQS. KDHE contends that the exceedance that was measured October 6, 2011, at the Goodland monitoring site was the result of natural events that were not reasonably controllable or preventable. This document describing the October 6, 2011 dust event was a collaborative effort involving staff from the Kansas Department of Health and Environment's Bureau of Air. Additionally, KDHE staff consulted with staff from the National Weather Service office in Goodland to acquire expert advice and assist with the collection of informational data.

Section 1 of this document provides a summary of the exceptional event rules and requirements and lays out how those rules are met within this specific document.

Section 2 of this document introduces the conceptual model of the meteorological events that transpired during the period from October 4-6, 2011, providing a background narrative of the exceptional event.

Section 3 of this document provides data summaries and time series graphs which help illustrate that the event of October 6, 2011 produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 4 of this document details the existing area agricultural control measures and demonstrates that despite the presence of these controls, the event of October 6, 2011 was not reasonably controllable or preventable.

Section 5 of this document establishes a clear causal connection between the natural events of October 6, 2011 and the exceedance of the 24-hour PM_{10} standard at the monitoring station. The evidence in this section (and the previous section on historical fluctuations) also

confirms that the events in question both affected air quality and were the result of natural events.

Section 6 of this document builds upon the demonstration showing a clear causal connection between the natural event and the exceedance and concludes there would have been no exceedance on October 6, 2011 but for the presence of the natural events.

Section 7 contains conclusions that summarize the exceptional event that occurred on October 6, 2011, and relates the requirements in the EER to the information within this document.

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1. Exceptional Event Rule (EER) Requirements

In addition to the technical requirements that are contained within the EER, procedural requirements must also be met in order for EPA to concur with the flagged air quality monitoring data. This section of the document lays out the requirements of the EER and associated guidance, and discusses how the Kansas Department of Health and Environment (KDHE) addressed those requirements.

1.1 Procedural Requirements

This section presents a review of the procedural requirements of the EER as required by 40 CFR 50.14 (*Treatment of Air Quality Monitoring Data Influenced by Exceptional Events*) and explains how KDHE fulfills them. The Federal EER requirements include public notification that an event was occurring, the placement of informational flags on data in EPA's Air Quality System (AQS), the notification of EPA of the intent to flag through submission of initial event description, the documentation that the public comment process was followed, and the submittal of a demonstration supporting the exceptional events flag. KDHE has addressed all of these procedural and documentation requirements.

1.1.1 Public notification that event was occurring (40 CFR 50.14(c)(1(i))

In Kansas, the National Weather Service (NWS) offices issue high wind warnings, dust advisories and dust warnings to the public. On October 6, 2011, the Goodland NWS issued a high wind warning advising citizens of high winds and dust during the day and evening across their entire forecast area. As part of this process, KDHE has worked with the NWS offices and has developed additional health related language to add to their warning products. This is discussed in more detail in Appendix A. The Goodland NWS forecast products that were issued on October 6, 2011, are included in Appendix B.

1.1.2 Place informational flag on data in AQS (40 CFR 50.14(c)(2)(ii))

KDHE submits data into EPA's AQS. Data from both filter-based and continuous monitors operated in Kansas are submitted to AQS.

When KDHE suspects that data may be influenced by an exceptional event, KDHE expedites analysis of the filters collected from the potentially-affected filter-based air monitoring instruments, quality assures the results and submits the data into AQS. KDHE also submits data from continuous monitors into AQS after quality assurance is complete.

If KDHE has determined a potential exists that the monitor reading has been influenced by an exceptional event, a preliminary flag is submitted for the measurement in the AQS. The data are not official until they undergo more thorough quality assurance and quality control, leading to certification by May 1st of the year following the calendar year in which the data were collected (40 CFR 58.15(a)(2)). The presence of the flag can be confirmed in AQS.

1.1.3 Notify EPA of intent to flag through submission of initial event description by July of the calendar year following event (40 CFR 50.14(c)(2)(iii))

KDHE submitted a letter to EPA in July 2012 listing the day from calendar year 2011 that KDHE intended to analyze under the Exceptional Events Rule. The exceedance that occurred on October 6, 2011, at the Goodland monitoring site (20-181-001) was included. This document serves as the demonstration supporting the flagging of this data.

1.1.4 Document that the public comment process was followed for event documentation (40 CFR 50.14(c)(3)(iv))

KDHE posted this document on the KDHE webpage for public review. KDHE opened a 30-day public comment period on November 8, 2013. A copy of the public notice, along with any comments received, will be submitted as part of this document, consistent with the requirements of 40 CFR 50.14(c)(3)(iv). See Section 8 for a copy of the public notice and comments.

1.1.5 Submit demonstration supporting exceptional event flag (40 CFR 50.14(a)(1-2))

At the close of the comment period, and after KDHE has had the opportunity to consider any comments submitted on this document, KDHE will submit this document, the comments received, and KDHE's responses to those comments to EPA Region VII headquarters in Lenexa, Kansas. The deadline for the submittal of this demonstration package is December 31, 2014.

Table 1-1. Kansas monitor with PM_{10} concentrations exceeding 150µg/m^3 in October 2011.

Monitor	AQS Site Code	Date in 2011	Observed 24-Hour Particulate Matter Concentration (µg/m^3)
Goodland (Sherman Co.)	20-181-0001	October 6	165.1

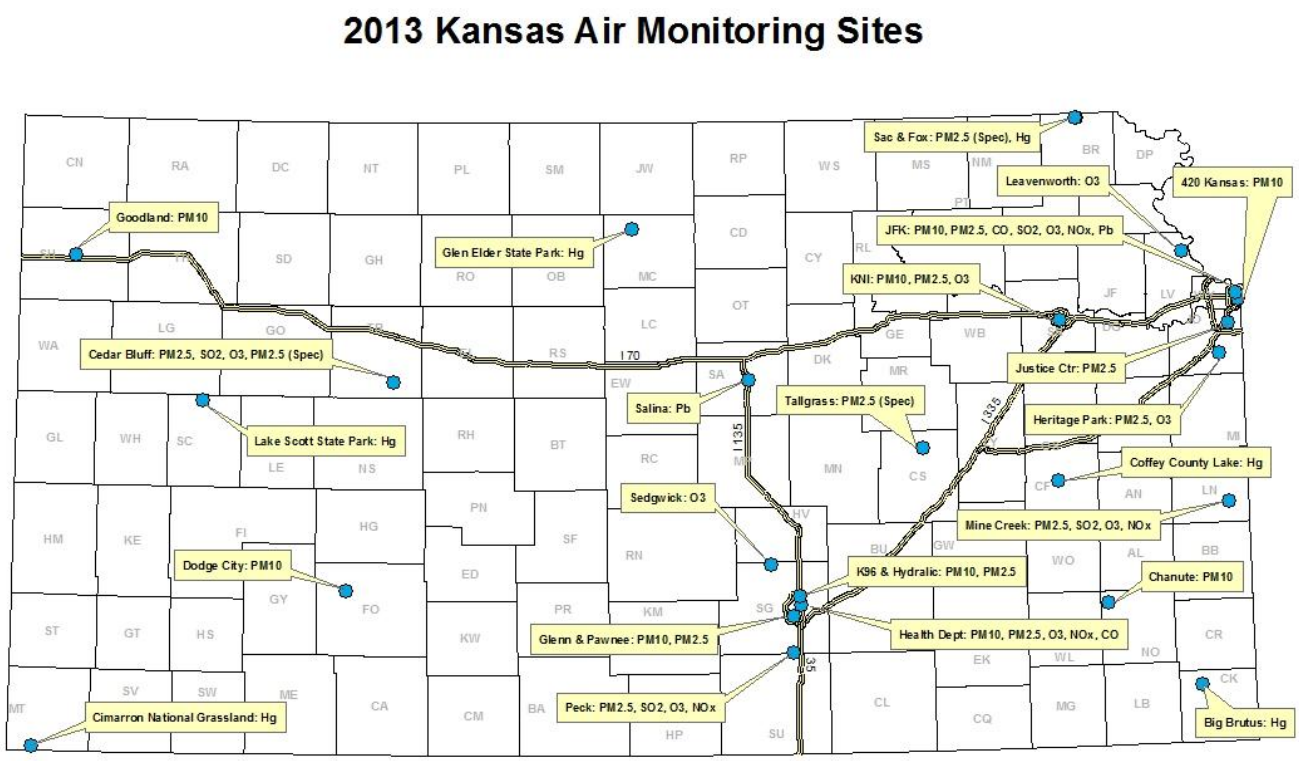

Figure 1-1. Kansas ambient air quality monitoring sites.

1.2 Documentation Requirements

Section 50.14(c)(3)(iii) of the EER states that in order to justify excluding air quality monitoring data, evidence must be provided for the following elements:

a. The event satisfies the criteria set forth in 40 CFR 501(j) that:

(1) the event affected air quality,

(2) the event was not reasonably controllable or preventable, and

(3) the event was caused by human activity unlikely to recur in a particular location or was a natural event;

b. There is a clear causal relationship between the measurement under consideration and the event;

c. The event is associated with a measured concentration in excess of normal historical fluctuations; and

d. There would have been no exceedance or violation but for the event.

Section 2 of this document introduces the conceptual model of the meteorological events that transpired on the two days proceeding and the actual event of October 6, 2011, providing a background narrative of the exceptional event and an overall explanation that 'the event affected air quality. Further evidence that 'the event affected air quality' is provided in Section 5. Sections 2 and 5 also provide evidence that the event was a natural event.

Section 3 of this document provides data summaries and time series graphs which help illustrate that the event of October 6, 2011 produced PM_{10} concentrations in excess of normal historical fluctuations.

Section 4 of this document details the existing area agricultural control measures and demonstrates that despite the presence of these controls, the event of October 6, 2011 was not reasonably controllable or preventable.

Section 5 of this document establishes a clear causal connection between the natural event of October 6, 2011 and the exceedance of the 24-hour PM_{10} standard at the monitoring station. The evidence in this section (and the previous section on historical fluctuations) also confirms that the events in question both affected air quality and were the result of natural events.

Section 6 of this document builds upon the demonstration showing a clear causal connection between the natural event and the exceedances and concludes there would have been no exceedance on October 6, 2011 but for the presence of the natural events.

2. Conceptual Model

2.1 Geographic Setting and Climate

This section describes the geographic and climatic setting of the monitor.

2.1.1 Geographic Setting of Monitor

Sherman County is in the northwestern part of Kansas (Figure 2-1). It occupies 675,841 acres, or 1,055.99 square miles. A large part of the county occupies nearly level to gently sloping uplands. The highest point is about 8 miles south of Kanorado; the elevation is about 4,000 feet. Several points in the southeastern part of the county are at an elevation of about 3,000 feet. Goodland, the county seat, is located at 39°20′55″N 101°42′40″W (39.348583, -101.711148) at an elevation of 3,681 feet (1,122 m). It has a population of 4,522 and the county population is 6,054 (2011, Census Bureau). It lies on the south side of the Middle Fork of Sappa Creek, part of the Republican River watershed, in the High Plains region of the Great Plains. Located at the intersection of Interstate 70 and K-27 in northwest Kansas, Goodland is roughly 17 miles (27 km) east of the Colorado state line, 176 miles east-southeast of Denver, 265 miles (426 km) northwest of Wichita, 1,065 miles (1,714 km) south of Flin Flon, Manitoba, Canada and 383 miles (616 km) west of Kansas City. Farming and ranching is the most common industry in the county (Figure 2-2). Growing wheat, corn, grain sorghum and raising cattle are the main sources of income. The breakdown of land mass is as follows: Agricultural Vegetation – 472,638 ac; Shrubland & Grassland – 177,321 ac; Developed & Other Human Use – 22,912 ac; Introduced & Semi Natural Vegetation – 1,909 ac; Forest & Woodland – 739 ac; Open Water – 161 ac; and Recently Disturbed or Modifiied – 158 ac.

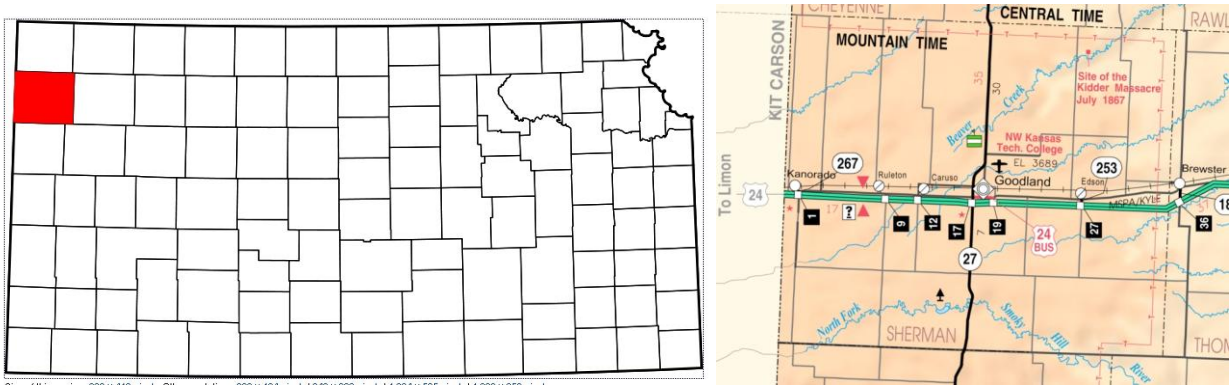

Figure 2-1. Location of Sherman County and Goodland, Kansas

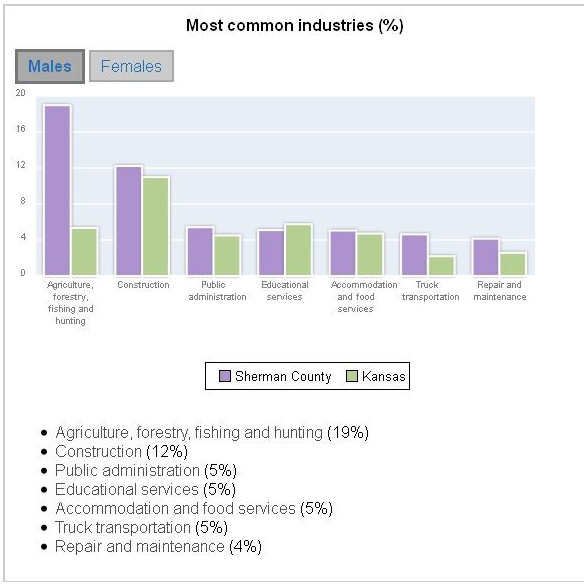

Figure 2-2. Most Common Industries in Sherman County, Kansas

2.1.2 Climate

Goodland has a semi-arid steppe climate with hot, dry summers and cold, dry winters. The average temperature for the year is 51 °F (10 °C) with temperatures exceeding 90 °F (32 °C) an average of 50 days a year and dropping below 32 °F (0 °C) an average of 159 days a year. Due to its higher elevation, Goodland experiences stronger wind and higher snowfall totals than other locations in Kansas. Wind speed averages 13 mph (21 km/h). On average, Goodland receives 19.75 inches (502 mm) of precipitation annually, and snowfall averages 41.9 inches (1,064 mm) per year. On average, January is the coolest month, and July is both the warmest month and the wettest month.

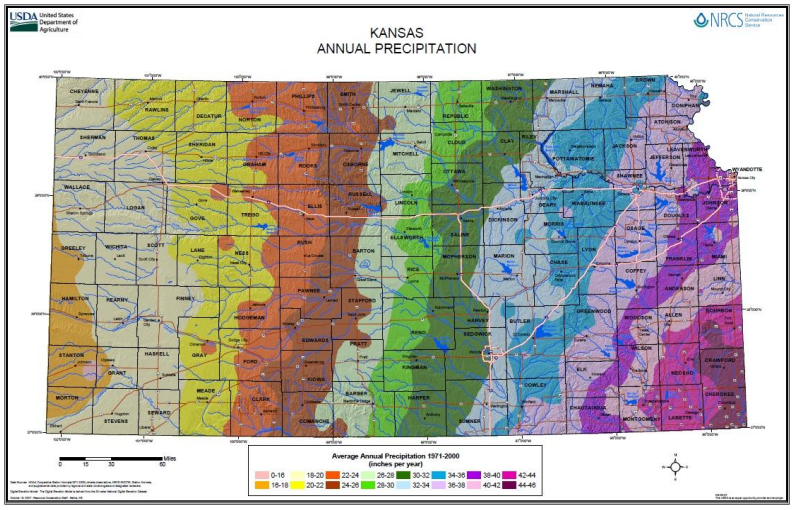

Figure 2-3. Kansas Annual Precipatation (USDA, NRCS)

Climate data for Goodland, Kansas

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Record high °F (°C)	79 (26)	81 (27)	90 (32)	96 (36)	104 (40)	109 (43)	111 (44)	108 (42)	105 (41)	96 (36)	87 (31)	83 (28)	111 (44)
Average high °F (°C)	39 (4)	45 (7)	53 (12)	63 (17)	72 (22)	84 (29)	89 (32)	87 (31)	78 (26)	66 (19)	50 (10)	41 (5)	64 (18)
Daily mean °F (°C)	28 (−2)	33 (1)	40 (4)	49 (9)	59 (15)	70 (21)	75 (24)	73 (23)	64 (18)	52 (11)	38 (3)	30 (−1)	50.9 (10.5)
Average low °F (°C)	16 (−9)	20 (−7)	26 (−3)	35 (2)	46 (8)	56 (13)	61 (16)	60 (16)	50 (10)	38 (3)	25 (−4)	18 (−8)	37 (3)
Record low °F (°C)	−26 (−32)	−22 (−30)	−20 (−29)	0 (−18)	21 (−6)	31 (−1)	40 (4)	38 (3)	19 (−7)	1 (−17)	−12 (−24)	−27 (−33)	−27 (−33)
Precipitation inches (mm)	0.43 (10.9)	0.44 (11.2)	1.20 (30.5)	1.51 (38.4)	3.46 (87.9)	3.30 (83.8)	3.54 (89.9)	2.49 (63.2)	1.12 (28.4)	1.05 (26.7)	0.82 (20.8)	0.40 (10.2)	19.75 (501.7)
Snowfall inches (cm)	7.4 (18.8)	5.5 (14)	8.7 (22.1)	5.1 (13)	0.6 (1.5)	0.1 (0.3)	0 (0)	0 (0)	0.4 (1)	3.0 (7.6)	5.9 (15)	5.2 (13.2)	41.9 (106.4)

Source: National Weather Service

Figure 2-4. Climatology data for Goodland, Kansas (NWS)

As noted above, Goodland already has higher wind speeds than other areas of Kansas. In addition, strong storm systems that move through the area from the west can lead to very strong winds and resultant blowing dust. The nature of these frontal dust events is such that specific source areas are difficult to determine as strong winds associated with low pressure systems can carry dust over vast distances encompassing many source areas. Because of this, it is more appropriate to speak of general source regions for these dust storms. A vast majority of the PM_{10} impacting the Goodland area from this low pressure driven high wind event during the period of October 4-6, originated outside of the Goodland area. The contributing source regions to the dust events were somewhat widespread, but the majority of the PM that was transported into Sherman County likely came from areas within eastern Colorado and southwest Kansas to the south and and west of Sherman County. The exact origin of the PM sources is often difficult to determine due to the less dense monitoring networks in the general source area.

Another important factor that contributed to this significant dust storm was the on-going long term drought across the region. The October 4-5, 2011 U.S. Drought Monitor placed a large area of southern Kansas (Figures 2-5 & 2-6) and southwest Colorado (Figure 2-7) in an area in D2 (Severe) to D4 (Exceptional) drought. In addition, as can be seen in Figure 2-8, most of the Southern Plains states were in exceptional drought conditions at this time. In fact, rainfall in southwest Kansas since the beginning of the year of 2011 leading up to the October 6th dust event had been less than 50% of normal (see Figure 2-9). As will be discussed in other sections of this document, these are all potential source regions for the dust event on October 6. The abnormally dry conditions resulted in a large area of soils that were vulnerable to particulate suspension.

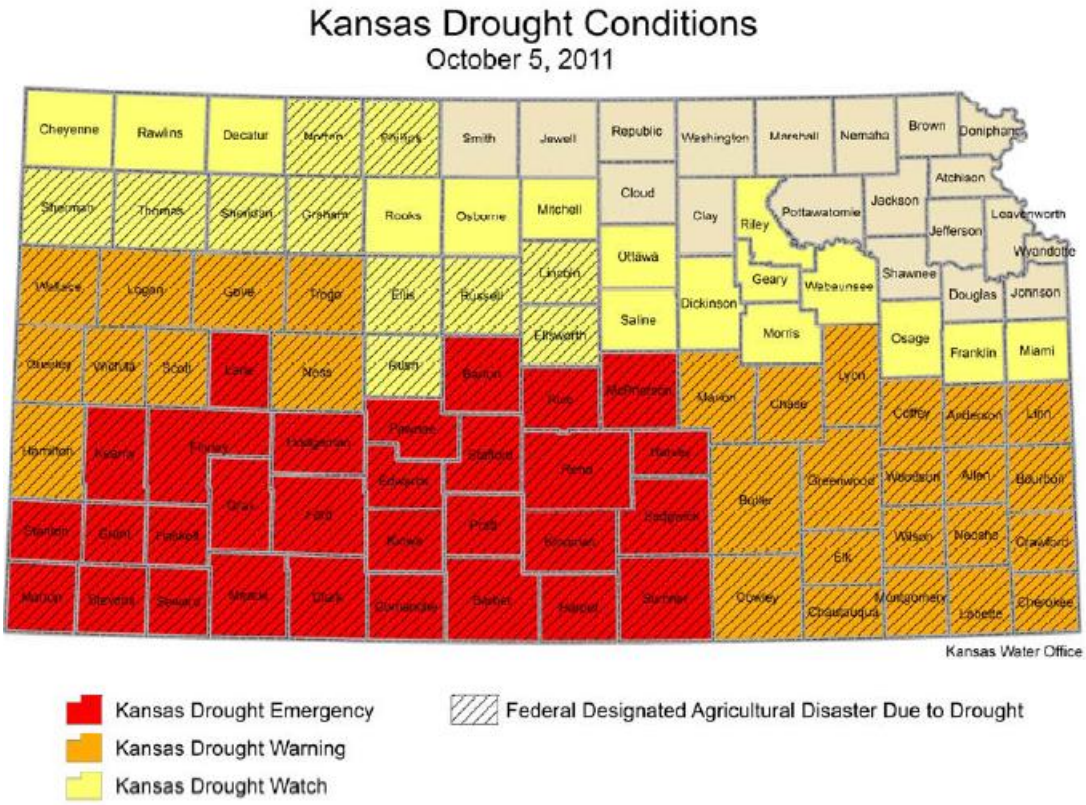

Figure 2-5. Kansas Drought Conditions October 5, 2011

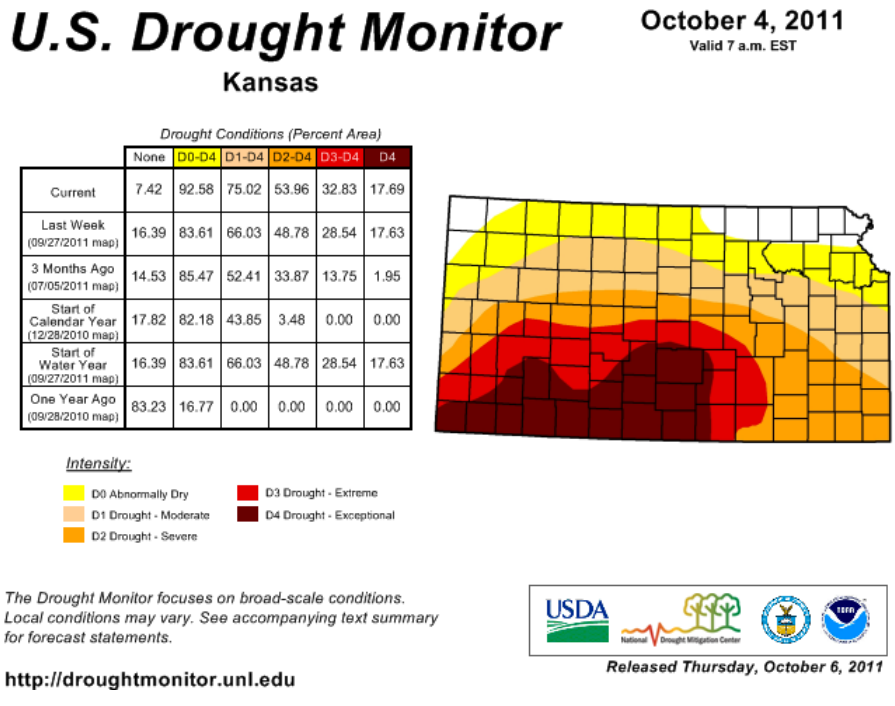

Figure 2-6. U.S. Drought Monitor Data for Kansas October 4, 2011 (USDA)

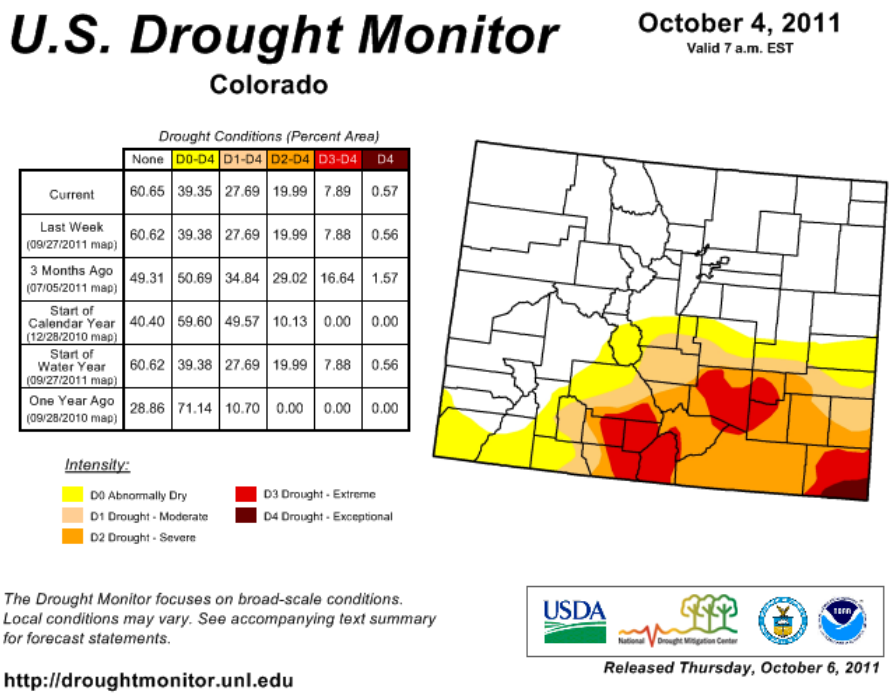

Figure 2-7. U.S. Drought Monitor Data for Colorado October 4, 2011 (USDA)

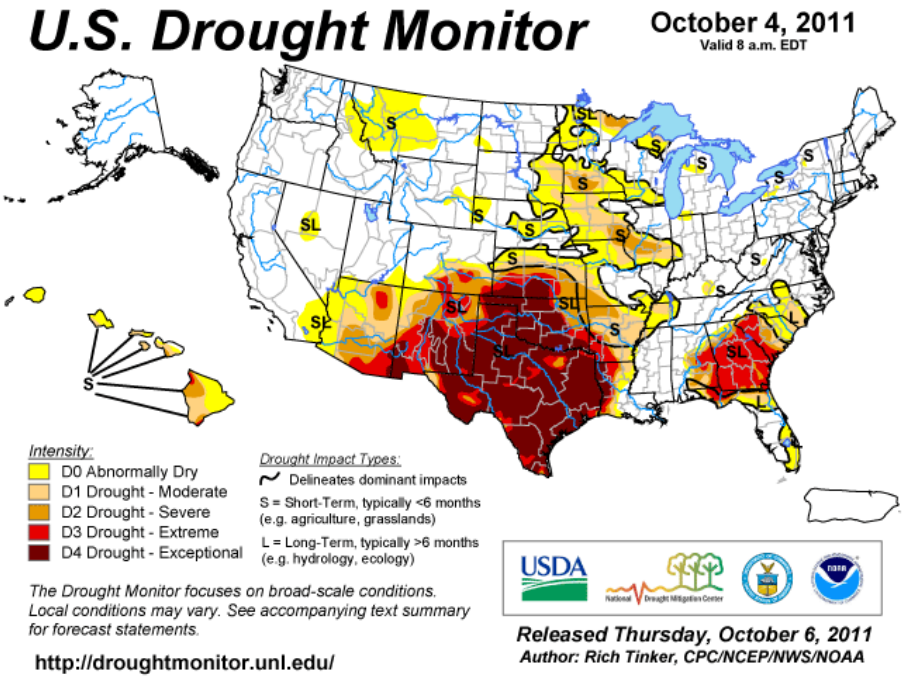

Figure 2-8. U.S. Drought Monitor Data October 4, 2011 (USDA)

Kansas Climate Division Precipitation Summary (inches)

Climate Division	October 1-10			January 1 to October 10			April 1 to October 10			September 1 to October 10		
	Actual	Normal	% Normal	Actual	Normal	% Normal	Actual	Normal	% Normal	Actual	Normal	% Normal
Northwest	1.96	0.43	431	15.41	18.21	83	14.27	16.01	87	2.27	2.24	98
West Central	1.78	0.42	448	12.6	17.69	71	11.07	15.48	72	2.20	2.32	97
Southwest	0.53	0.41	133	7.31	17.33	42	6.39	15.20	42	1.27	2.30	55
North Central	0.38	0.68	64	20.34	23.77	85	18.2	20.55	88	1.03	3.73	29
Central	0.32	0.78	44	14.78	24.85	59	12.26	21.26	58	1.39	3.86	36
South Central	0.49	0.77	62	10.23	24.28	41	8.12	20.58	38	1.35	3.89	33
Northeast	0.05	1.03	5	21.25	30.14	70	17.78	26.09	68	1.09	5.41	20
East Central	0.01	1.11	1	17.06	31.01	55	13.10	26.38	50	1.35	5.45	25
Southeast	0.03	1.20	3	19.80	31.75	62	14.43	26.32	54	1.87	5.59	33
STATE	0.59	0.75	124	14.9	24.17	61	12.36	20.71	59	1.52	3.83	46

Note: 1971-2000 normal value, 100 % =normal
Source: KSU Weather Data Library

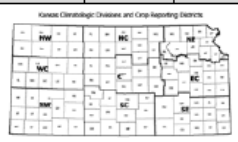

Figure 2-9. Kansas Climate Division Precipitation Summary 2011 (KSU Weather Data Library)

2.2 Event Summary

To analyze the specific conditions on the days leading up to and including the day when the 24-hour PM_{10} concentrations exceeded the standard (165.1µg/m^3) at the Goodland monitoring station in October 2011, air quality and meteorological data were first collected from a wide variety of sources (Table 2-1). These sources were selected because of their high standards for data quality. Additional meteorological parameters, such as vector average winds and daily maximum temperatures, were calculated as necessary. Table 2-2 describes why these data are needed to understand and explain the processes that may lead to dust event conditions.

Table 2-1. Data types and sources used in the Exceptional Events analysis.

Type of Data	Source(s)	Location(s)	Date Range
Air Quality Data: 1-hour PM_{10} 24-hour PM_{10}	KDHE	Kansas air quality monitors	Jan. through Dec., 2007-2011
Surface meteorological data (METAR[a])	National Weather Service (NWS)	All available Kansas sites and surrounding states sites	Jan. through Dec., 2007-2011
Upper-air meteorological data (radiosonde)	NWS	Dodge City, KS (KDDC) Norman, OK (KOUN)	October 2011

Surface and upper-level weather maps	NWS, Plymouth Weather Center, Hydrometeorological Prediction Center	National and regional	October 2011
Visible and infrared satellite imagery	NWS	National	October 2011
Daily MODIS[b] Visible satellite imagery	SSEC[c]	National	October 2011

[a] Meteorological Terminal Aviation Routine Weather Report
[b] Moderate Resolution Imaging Spectroradiometer
[c] Space Science and Engineering Center, University of Wisconsin-Madison

Table 2-2. Description of processes that influence particulate levels.

Type of Data	Relation to Particulate Levels
Surface wind speeds	Surface wind data were used to assess pollutant dispersion. Strong winds can result in higher PM levels in the atmosphere.
Trajectories (HYSPLIT[a])	Trajectory analysis was used to assess transport of pollutants. Air parcels originating in or passing through regions of higher pollution levels (e.g., dust) indicate potential transport of pollutants to downwind locations.
Upper-air soundings	Soundings were used to assess atmospheric stability (and inversions) and the likelihood that dust would remain in the lower levels of the atmosphere as opposed to being mixed into aloft layers. Confirming that the dust would most likely remain in the lower layers of the atmosphere also provides guidance on which trajectory levels are appropriate to assess dust transport.
Upper-level weather maps	500 mb weather maps were used to determine the locations of upper-level ridges and upper-level troughs.
Surface weather maps	Surface weather maps were used to determine the positions of high- and low-pressure systems and frontal boundaries in relation to the impacted monitors. These meteorological features are the primary drivers of surface wind speed and direction, and thus of pollutant dispersion and transport.
Satellite imagery	Satellite imagery was used to assess potential dust at the impacted monitors.
PM_{10} and visibility	Particle concentrations from air quality monitors and visibility observations from airports were collected to assess the presence of dust at air quality monitors.

[a] Hybrid Single Particle Lagrangian Integrated Trajectory Model

High winds can entrain and transport particulate matter (PM) to a monitoring site. These particles can consist of both PM_{10} (i.e., particles less than or equal to 10 micrometers (µm) in diameter) and $PM_{2.5}$ (i.e., particles less than 2.5 µm in diameter). High wind dust events can include both PM_{10} and $PM_{2.5}$. During the period from October 4-6, 2011, a potent storm system was slowly approaching the tri-state region of Colorado, Kansas and Nebraska.

2.2.1 October 4, 2011

On October 4, 2011, a developing storm system was located off the coast of British Columbia with additional low pressures over the Intermountain West with a 1004 millibar surface low pressure centered in central Idaho and northern Montana. A large area of high pressure was also located from the Great Lakes to the Gulf Coast as can be seen in the 12z October 4, 2011 (5a.m. MST October 4) surface analysis in Figure 2-10. In addition, the low pressure system off the coast of British Columbia was associated with a strong upper level low which is shown in Figure 2-11, the 500-millibar analysis for 12Z October 4, 2011 (5a.m. MST October 4). These features and their accompanying circulations were beginning to generate strong southerly winds over the Great Plains by 5p.m. on October 4 (Figure 2-12).

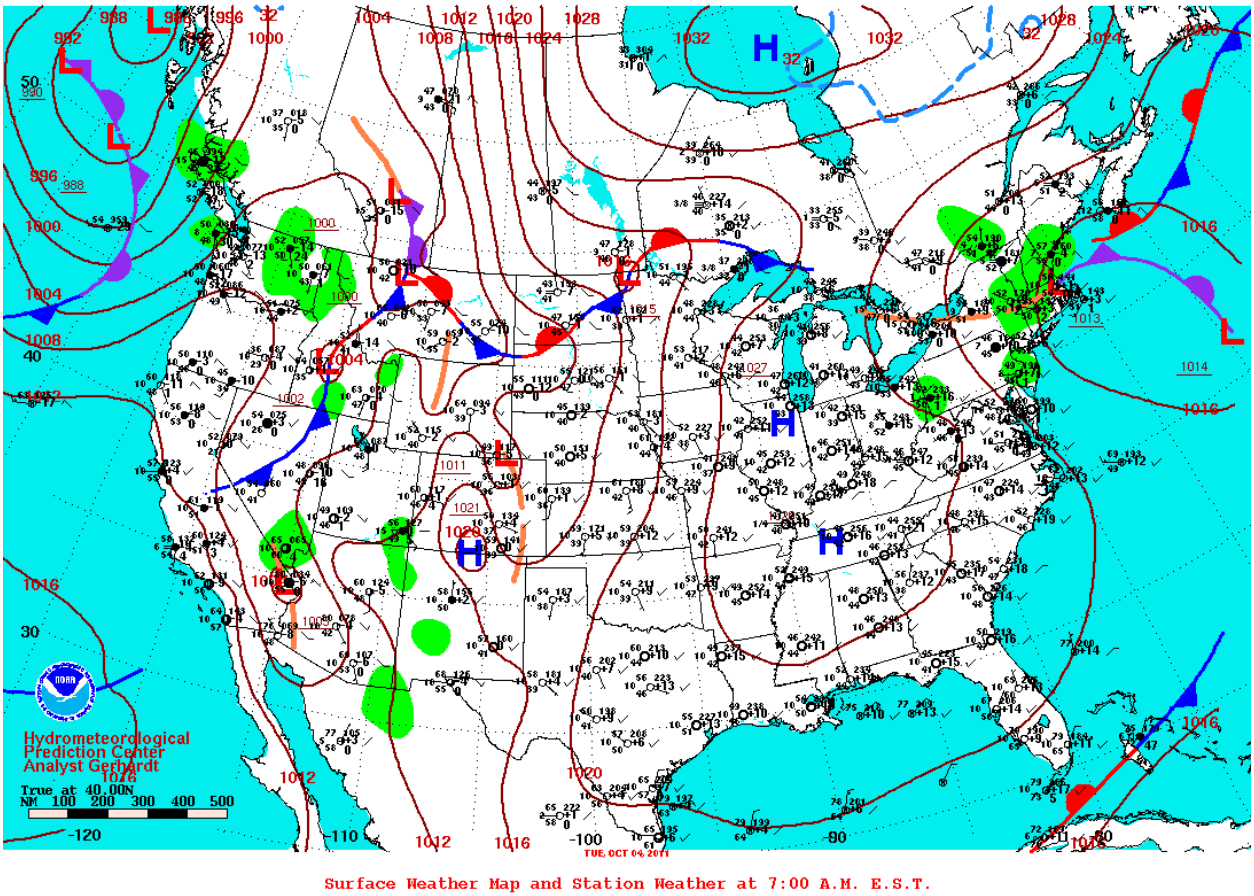

Figure 2-10. Surface analysis for 12Z October 4, 2011 (5a.m. MST October 4)(Hydrometeorological Prediction Center)

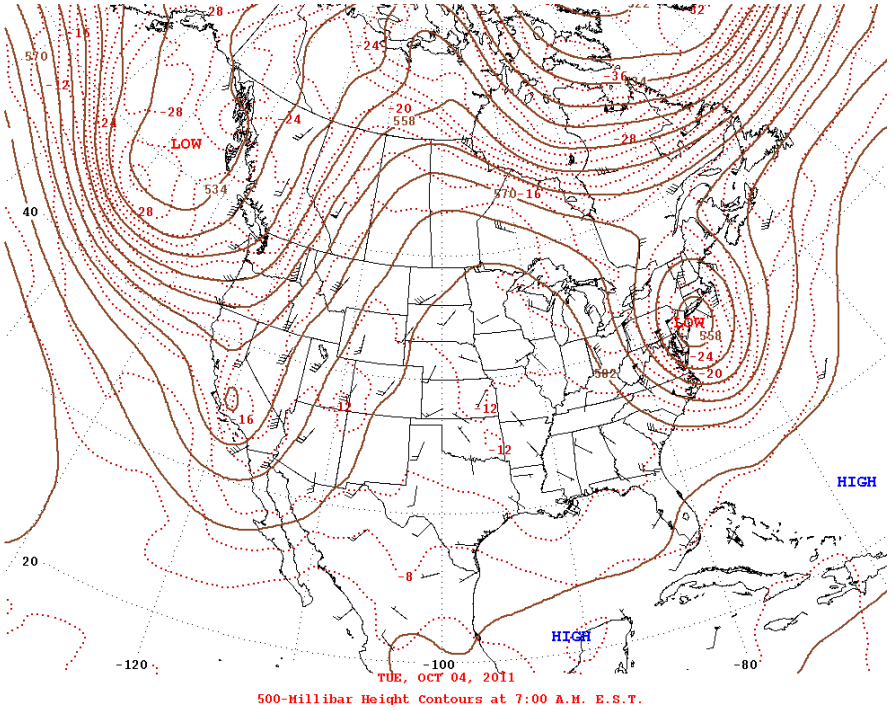

Figure 2-11. 500 mb analysis for 12Z October 4, 2011 (5a.m. MST October 4) (from NCDC)

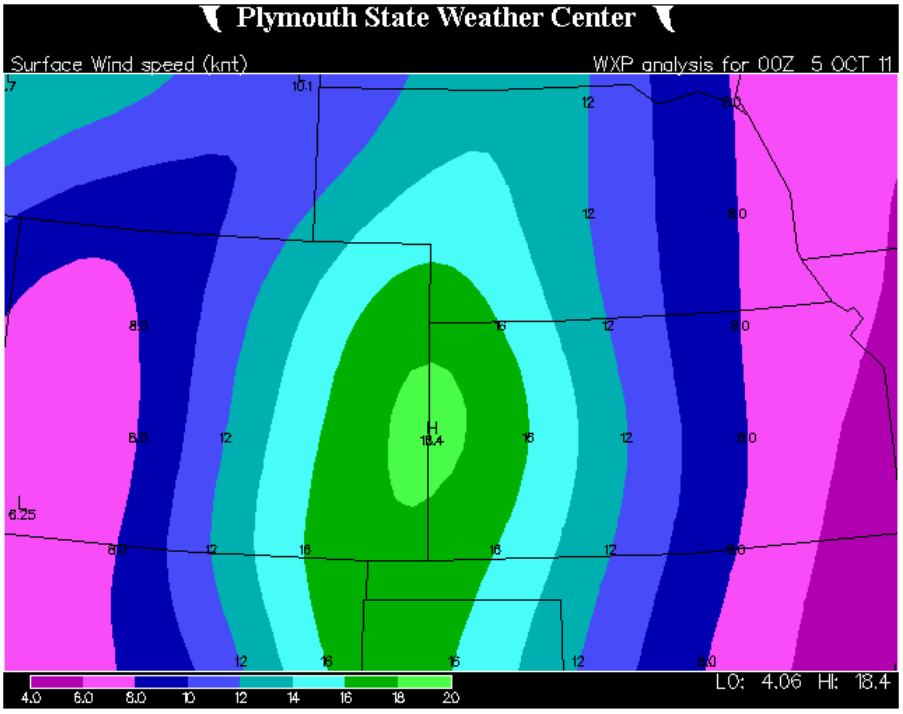

Figure 2-12. Surface wind speed (kts) for 00Z October 5, 2011 (5p.m. MST October 4)(Plymouth State Weather Center)

2.2.2 October 5, 2011

On the morning of October 5, 2011, the main storm system was approaching the coast of Washington with it's associated cold front moving into central Oregon and California. There were also two 998 millibar surface low pressure systems centered in central Idaho and eastern Montana. The large area of high pressure over Illinois had begun to shift off to the east in response to the large storm system approaching the coast and can be seen in the 12z October 5, 2011 (5a.m. MST October 5) surface analysis in Figure 2-13. The strong upper level low which is shown in Figure 2-14, the 500-millibar analysis for 12Z October 4, 2011 (5a.m. MST October 4), was stacked above the surface low pressure just off the coast of Washington. Increasing southerly winds continued blowing across the southern and central Great Plains, with sustained winds now reaching over 20kts (23mph) in portions of western Kansas and a large area over 18kts (21mph) stretching from the northern Texas panhandle to the Dakotas (Figure 2-15).

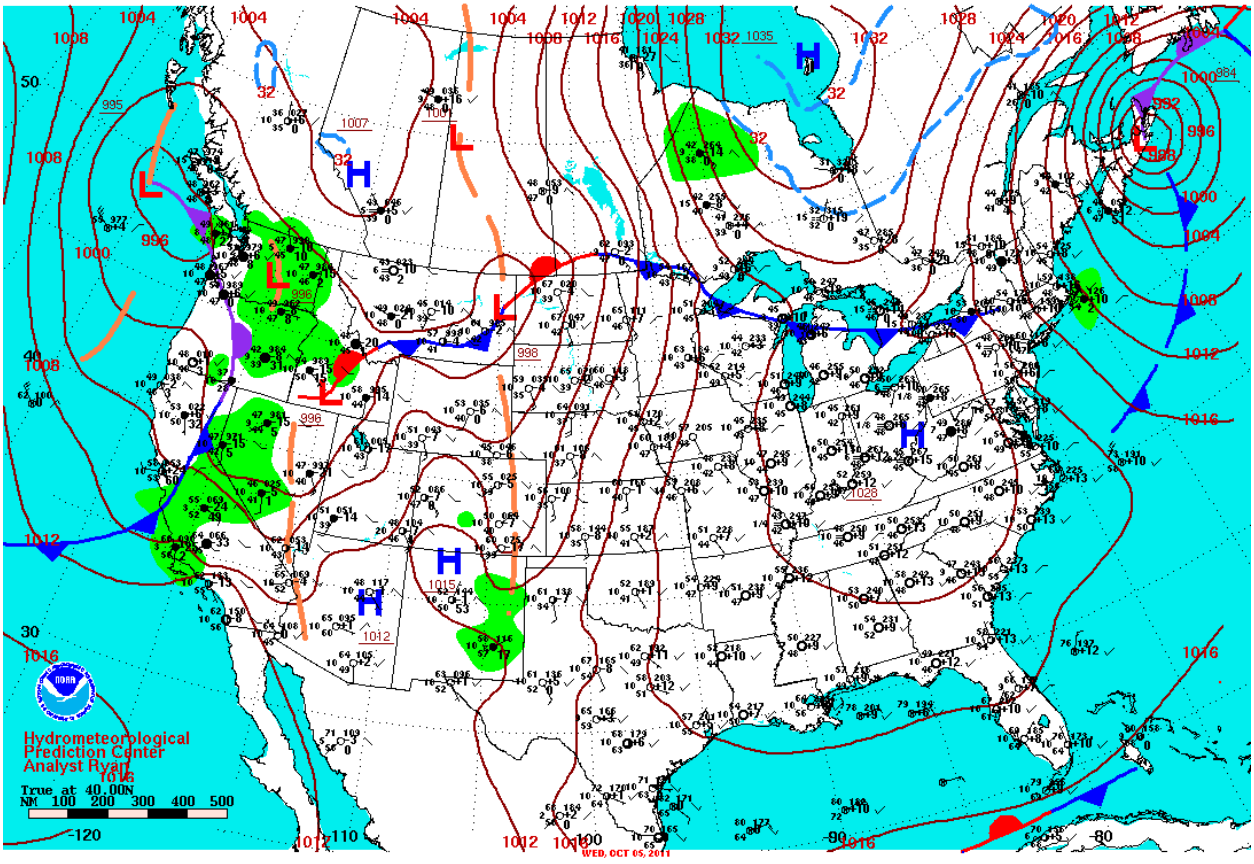

Figure 2-13. Surface analysis for 12Z October 5, 2011 (5a.m. MST October 5)(Hydrometeorological Prediction Center)

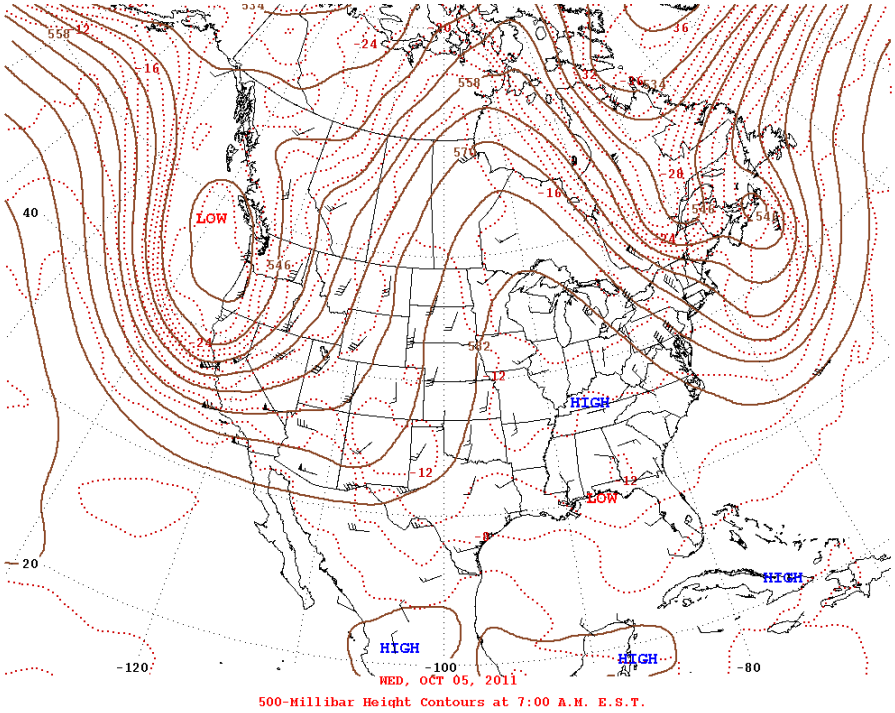

Figure 2-14. 500 mb analysis for 12Z October 5, 2011 (5a.m. MST October 5) (from NCDC)

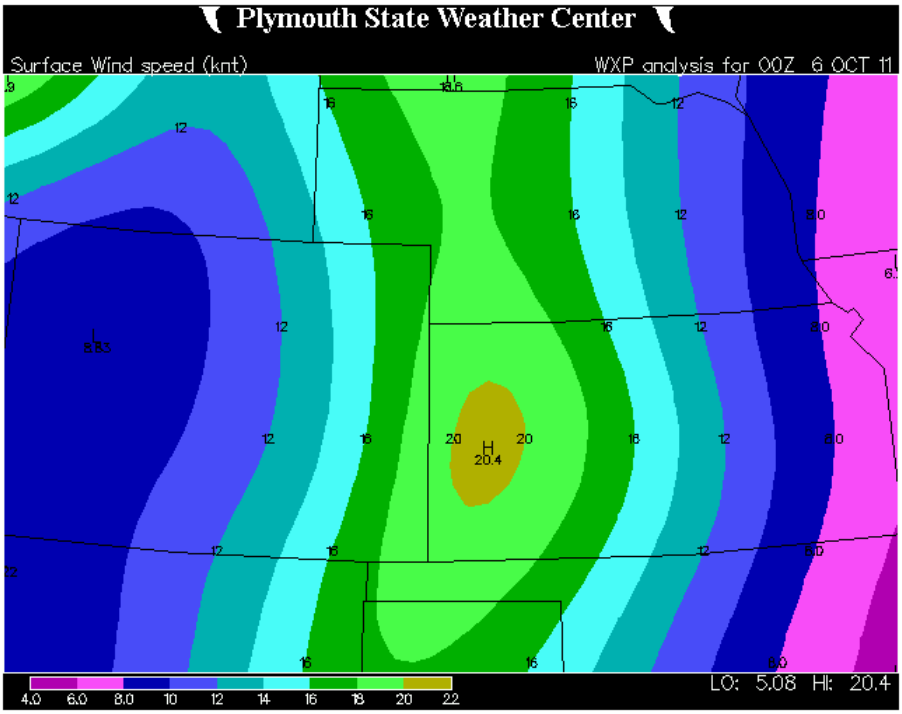

Figure 2-15. Surface wind speed (kts) for 00Z October 6, 2011 (5p.m. MST October 5)(Plymouth State Weather Center)

2.2.3 October 6, 2011

On Thursday October 6, 2011, the Goodland, Kansas air monitoring site recorded an exceedance of the twenty-four-hour PM_{10} standard with a concentration of 165.1 µg/m^3. The Goodland monitoring site is located on the roof of the Goodland fire station near downtown and is a filter based monitoring instrument (Figure 2-16). Elevated continuous one-hour maximum PM_{10} readings were also recorded at the Dodge City monitor with a one-hour PM_{10} concentration of 177 µg/m^3, the Wichita - Glenn and Pawnee monitor with a one-hour maximum PM_{10} concentration of 139 µg/m^3, and the Wichita - K96 and Hydraulic monitor with a one-hour maximum PM_{10} concentration of 173 µg/m^3. The twenty-four-hour PM_{10} concentration at the Goodland monitoring site was above the 99th percentile concentrations for it's location. This is evidence that the event is associated with a measured concentration in excess of normal historical fluctuations including background.

This exceedance and the elevated readings were the consequence of several days of strong gusty winds ahead of a deep low pressure with a trailing cold front, in combination with dry conditions which caused significant blowing dust across parts of Colorado, Oklahoma, and western Kansas. The prefrontal winds were the result of two 993-millibar surface low pressure systems centered over western Wyoming and eastern Utah with a cold front trailing to the south as shown in the 12Z October 6, 2011 (5a.m. MST October 6, 2011) surface analysis in Figure 2-17. The low pressure system over Utah intensified and moved to the northeast into western Nebraska as shown in the 0Z October 7, 2011 (5p.m. MST October 6, 2011) surface analysis in Figure 2-18. The cold front associated with this system was approaching western Kansas.

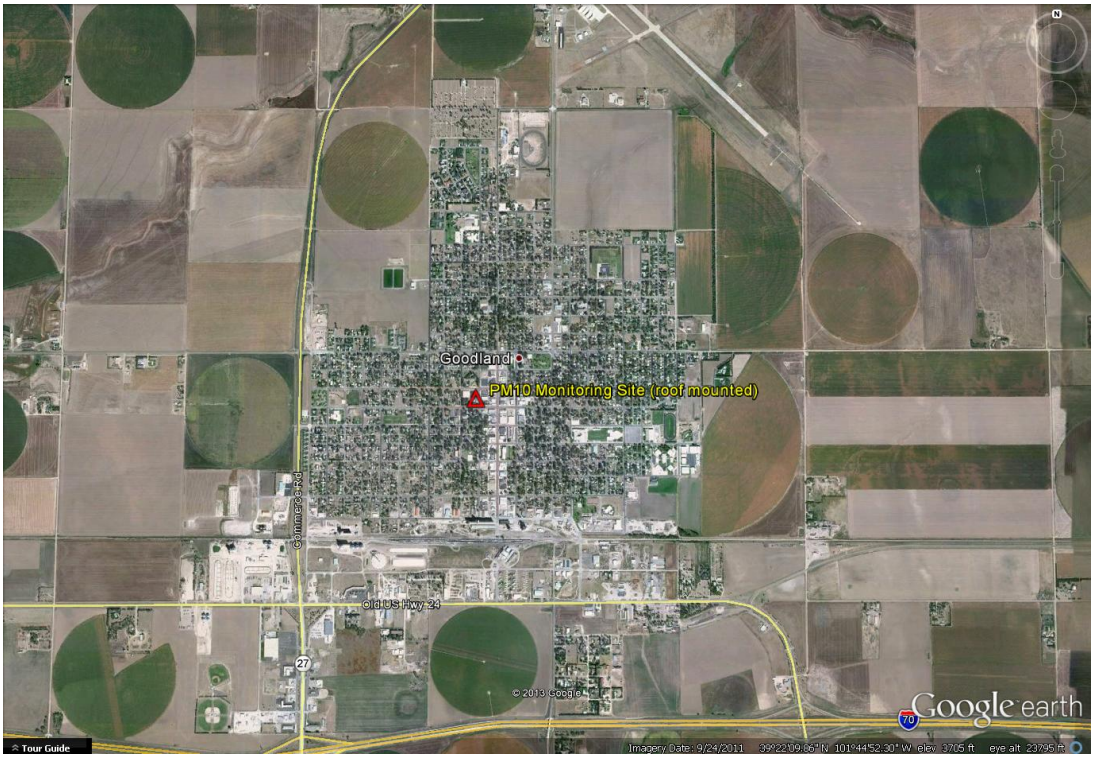

Figure 2-16. Goodland, KS PM_{10} Monitoring site location (Google Earth)

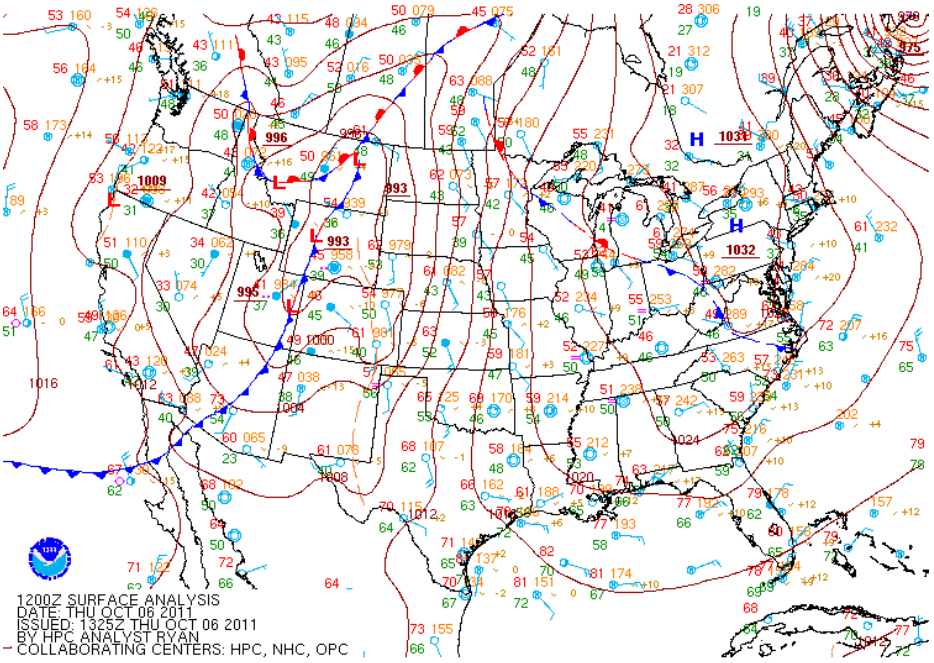

Figure 2-17. Surface analysis for 12Z October 6, 2011 (5a.m. MST October 6)(Hydrometeorological Prediction Center)

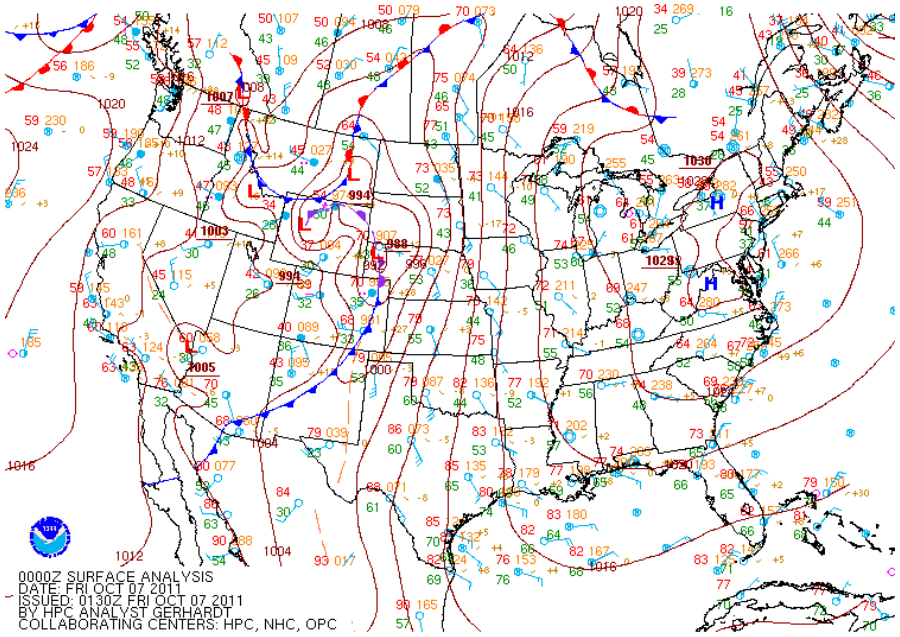

Figure 2-18. Surface analysis for 00Z October 7, 2011 (5p.m. MST October 6)(Hydrometeorological Prediction Center)

These surface features were associated with a strong upper level low moving into the Great Basin which is shown in Figure 2-19, the 500-millibar analysis for 12Z October 6, 2011 (5a.m. MST October 6, 2011). There was a localized wind maximum of 70 to 90 knots over Southern California which was rotating around the base of this upper level low. Once the morning inversion lifted to a higher level, the momentum associated with these winds would have mixed down to the surface and enhanced the prefrontal winds associated with the strong low pressure systems and cold front in Figure 2-18. Strong southerly winds continued blowing across the southern and central Great Plains, with sustained winds now reaching over 32kts (37mph) in portions of western Kansas and eastern Colorado and a large area over 30kts (35mph) stretching from the northeast New Mexico through southwest Nebraska (Figure 2-20).

In addition, the National Weather Service offices across the region, including Goodland, KS, Dodge City, KS, Amarillo, TX, Norman, OK, and Pueblo, CO. all had issued either high wind advisories or warnings with blowing dust throughout the day into the evening on this day. A couple of examples of these products are show in Figure 2-21 and all regional NWS products from October 6, 2011 are contained in Appendix B.

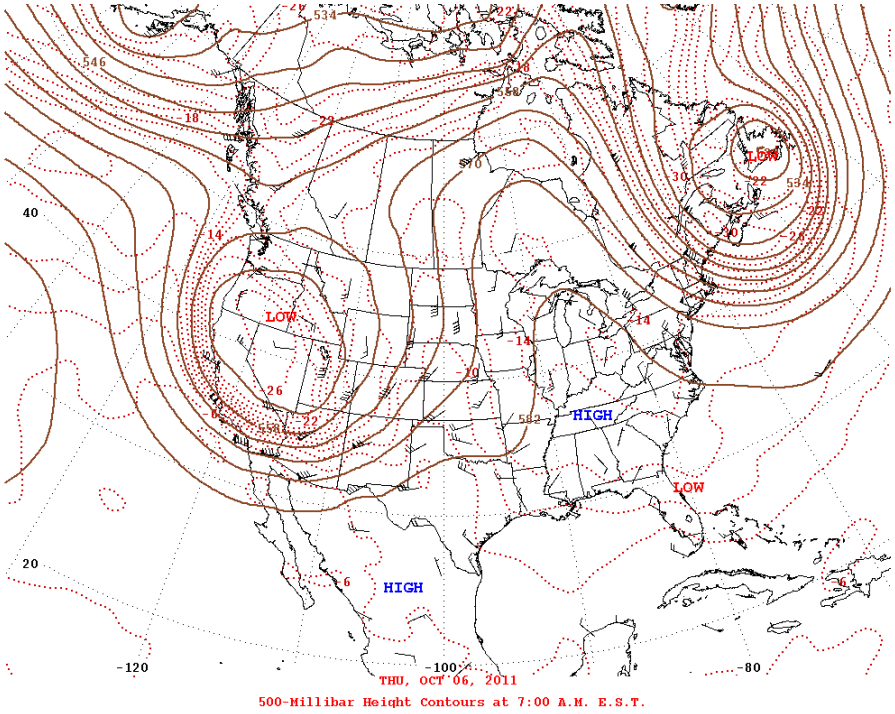

Figure 2-19. 500 mb analysis for 12Z October 6, 2011 (5a.m. MST October 6) (NCDC)

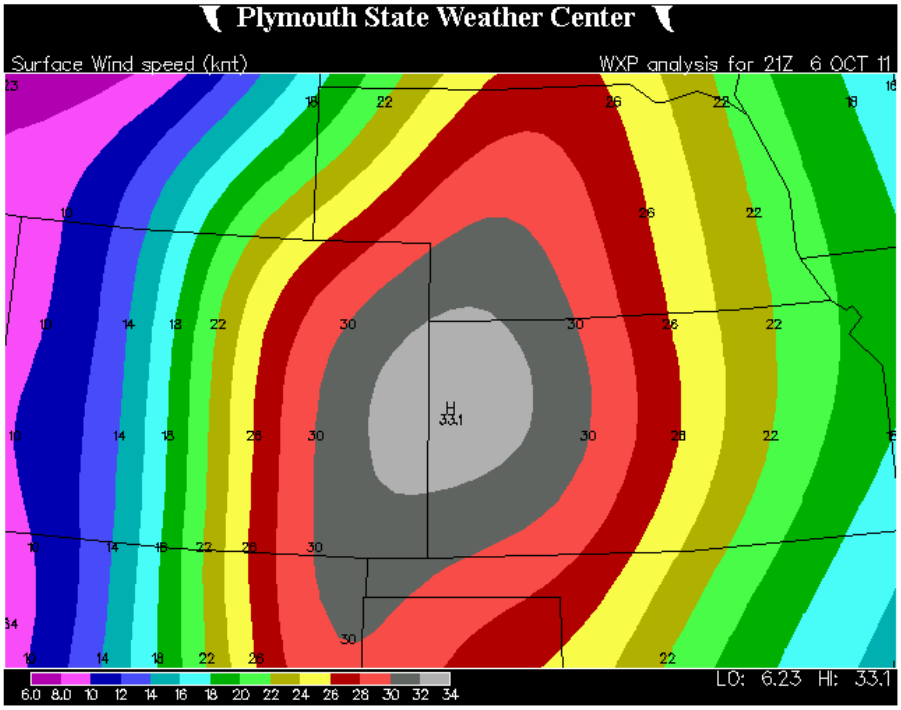

Figure 2-20. Surface wind speed (kts) for 21Z October 6, 2011 (2p.m. MST October 6)(Plymouth State Weather Center)

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964
FPUS73 KGLD 061818
NOWGLD

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE GOODLAND KS
1210 PM MDT THU OCT 6 2011

COZ090>092-KSZ001>004-013>016-027>029-041-042-NEZ079>081-062300-
CHEYENNE CO-CHEYENNE KS-DECATUR-DUNDY-GOVE-GRAHAM-GREELEY-HITCHCOCK-
KIT CARSON-LOGAN-NORTON-RAWLINS-RED WILLOW-SHERIDAN-SHERMAN-THOMAS-
WALLACE-WICHITA-YUMA-
INCLUDING THE CITIES OF...BENKELMAN...BURLINGTON...COLBY...
GOODLAND...HILL CITY...LEOTI...MCCOOK...NORTON...OBERLIN...YUMA
1210 PM MDT (110 PM CDT) THU OCT 6 2011

.NOW...

AREAS OF BLOWING DUST HAVE DEVELOPED AND WILL CONTINUE FOR THE REST
OF THE AFTERNOON. VERY LOW VISIBILITIES HAVE ALREADY BEEN REPORTED
ALONG INTERSTATE 70. MOTORISTS NEED TO DRIVE WITH CAUTION...AND BE
PREPARED FOR RAPIDLY CHANGING VISIBILITIES...ESPECIALLY NEAR NEWLY
PLOWED FIELDS. VISIBILITIES NEAR ZERO WILL OCCUR AND HAVE ALREADY
OCCURRED.

$$

BULLER
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Figure 2-21. Short Term Forecast issued by Goodland NWS for blowing dust October 6, 2011 (12:10p.m. MST October 6)(Goodland NWS)

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177
FPUS73 KGLD 062039
NOWGLD

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE GOODLAND KS
239 PM MDT THU OCT 6 2011

COZ090>092-KSZ001>004-013>016-027>029-041-042-NEZ079>081-070000-
CHEYENNE CO-CHEYENNE KS-DECATUR-DUNDY-GOVE-GRAHAM-GREELEY-HITCHCOCK-
KIT CARSON-LOGAN-NORTON-RAWLINS-RED WILLOW-SHERIDAN-SHERMAN-THOMAS-
WALLACE-WICHITA-YUMA-
INCLUDING THE CITIES OF...BENKELMAN...BURLINGTON...COLBY...
GOODLAND...HILL CITY...LEOTI...MCCOOK...NORTON...OBERLIN...YUMA
239 PM MDT (339 PM CDT) THU OCT 6 2011

.NOW...

AREAS OF BLOWING DUST HAVE DEVELOPED AND WILL CONTINUE INTO EARLY
THIS EVENING. VERY LOW VISIBILITIES HAVE ALREADY BEEN REPORTED ALONG
INTERSTATE 70. IN FACT...THE INTERSTATE FROM BURLINGTON TO COLBY HAS
BEEN CLOSED DUE TO POOR VISIBILITY. MOTORISTS NEED TO DRIVE WITH
CAUTION...AND BE PREPARED FOR RAPIDLY CHANGING VISIBILITIES...
ESPECIALLY NEAR NEWLY PLOWED FIELDS. VISIBILITIES NEAR ZERO WILL
OCCUR AND HAVE ALREADY OCCURRED.

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BULLER
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Figure 2-22. Short Term Forecast issued by Goodland NWS for blowing dust October 6, 2011 (2:39p.m. MST October 6)(Goodland NWS)

2.3 Conclusions

This Conceptual Model was created to provide a basic description of the weather set-up that led to the dust storm on October 6, 2011 and the PM_{10} exceedance in Sherman County (Goodland). A more detailed analysis of the windblown dust event is included in Section 5, where a demonstration of the clear causal connection between uncontrollable natural events and the PM_{10} exceedance day is presented.

3. Historical Fluctuations

The PM_{10} concentration measured in Sherman County at the Goodland monitoring site during October 6, 2011 was the highest 24-hour average measured over the last five years. A time series plot of the 24-hour PM_{10} concentrations for the period January 1, 2007 through December 31, 2011 was created for the exceeding monitor in Sherman County. Additionally, a time series plot of the daily maximum hourly average PM_{10} concentrations was created for the nearest continuous PM_{10} monitor in the network in Dodge City, approximately 140 miles southeast of Goodland. The Dodge City monitor was selected as it was the closest continuous monitor that effects of the dust storm during October 6 can also be seen in the data. The graph below shows that the October 6th event was the most significant event of the five year period.

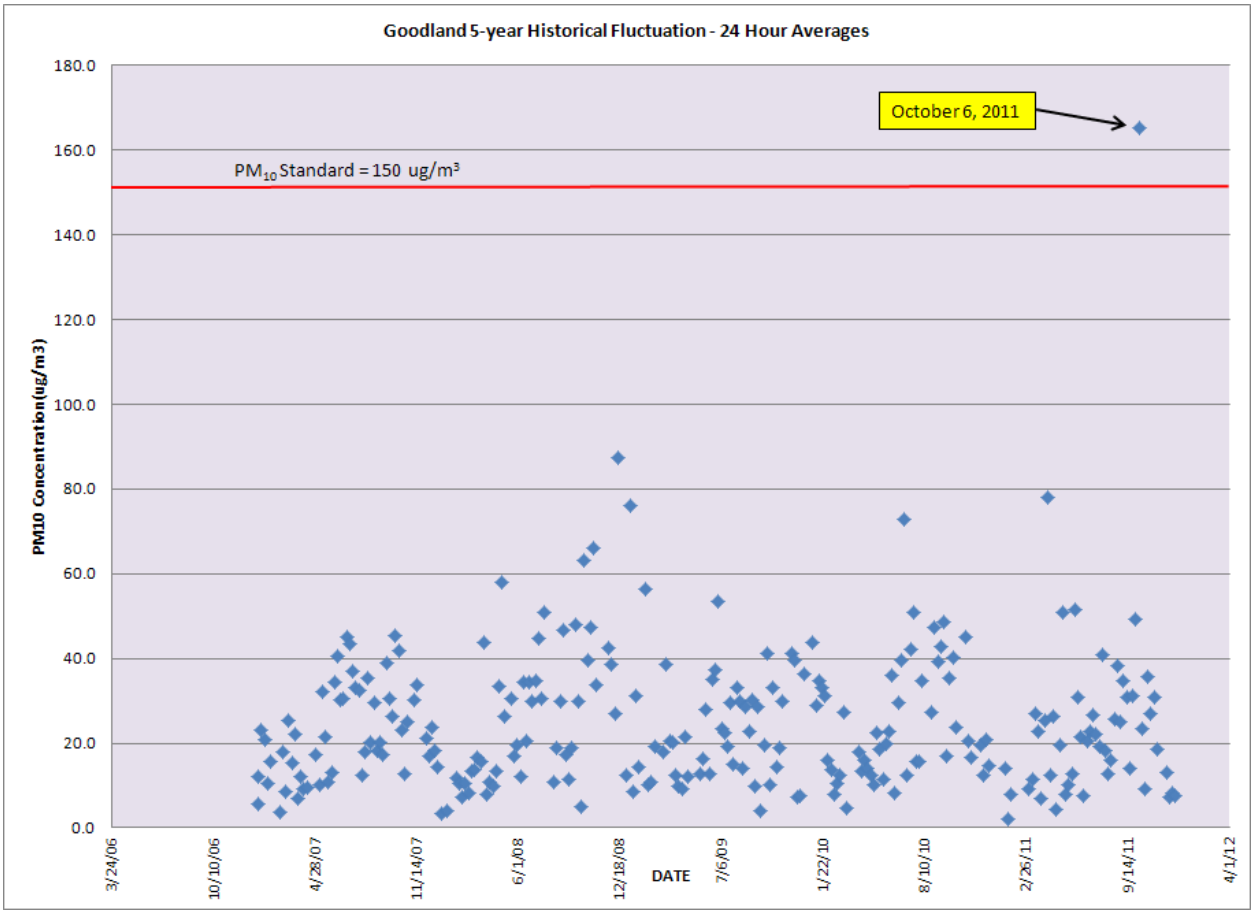

Figure 3-1. Plot of 24-hour average PM_{10} concentrations (2007-2011) at Goodland monitoring site

Figure 3-1 shows the daily 24-hour averages from the Goodland PM_{10} monitor. The plot shows that the October 6th, 2011 24-hour average of 165.1 $\mu g/m^3$ was the highest PM_{10} concentration recorded in the five year period between 2007 and 2011. One will notice that the October 6th value is almost twice as high as any other monitored value recorded in this five year

analysis. In fact, the average concentration of PM_{10} recorded at this site between 2007-2011 was 24.8 µg/m^3 as can be seen on Table 3-1.

Table 3-1. Goodland PM_{10} Monitoring Data Summary (2007-2011)

	Goodland PM_{10}
Mean	24.8
Median	20.6
Mode	12.3
sd	17.1
Variance	291.7
Minimum	2.2
Maximum	165.1
Count	255
10/6/2011	165.1

The spatial scope of this event, addressed elsewhere in this document, was fairly broad and had an impact on PM_{10} concentrations at multiple sites. However, the 165.1 µg/m^3 at Goodland was the only sample greater than the 150 µg/m^3 24-hour standard; therefore the Goodland site will be the only data set discussed in detail. A snapshot of data from other PM_{10} sites across the state and region are shown in Table 3-2.

Table 3-2. Regional 24-hour and 1-hour PM_{10} readings for October 6, 2011

PM_{10}

October 6, 2011	24 hr Maximum		1 hr Max Continuous
Dodge City	63		177
Chanute	48		
Glenn & Pawnee	57		139
Wichita HD	40		87
K96 & Hydraulic	56		173
KNI	40		90
Goodland	165.1		
420 KS	48		
JFK	46		
Gothenburg, NE	139		
Cozad, NE	120		
Lamar, CO	115		

The approximate percentile value that the Goodland October 6th, 2011 exceedance represents for its unique historical data set, for the month of the event (every sample in any October), and for the year are presented in Table 3-3. All data sets were restricted to the interval 2007 – 2011.

Table 3-3. Percentile Values for High PM_{10} Concentration in Goodland (2007-2011 Data)

Evaluation	Goodland
October 6, 2011	165.1 µg/m^3
Overall	99.6%
All October	95.8%
2011	98.0%

The Goodland data set was summarized by month and year. These summaries (see Tables 3-4 & 3-5) show slightly higher monthly averages between June and November; PM_{10} levels at any particular site in Kansas do not necessarily fluctuate by season. Of greater importance affecting day-to-day, typical PM_{10} concentrations are local sources, e.g. road sanding and sweeping, regional agriculture activities, vehicle contributions via road dust, unpaved lots or roads, etc. While the historic monthly median values for Goodland are higher between June and November than the rest of the year there is little month-to-month variation. This time frame (summer and fall) is that which is most likely to experience the meteorological and dry conditions exhibited during this event and discussed in other sections of this document. If a conservative approach is taken then a typical value should be no higher than the historic monthly 75th percentile value. The summary data for the month of October (all samples in any October from 2007 - 2011) and for 2011 is presented in Table 3-5.

Table 3-4. Monthly PM_{10} Monitoring Data Summary for Goodland Monitor

Site	Goodland (2007-2011)											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Mean	20.2	14.3	17.6	19.5	18.4	29.9	30.8	26.1	27.7	37.2	28.5	21.8
Median	14.2	10.6	15.5	13.4	16.5	30.6	29.5	25.8	29.9	33.2	30.3	17.0
Mode	31.2	N/A	N/A	9.3	19.6	34.4	15.7	N/A	N/A	N/A	N/A	N/A
sd	17.12	12.27	10.18	17.22	9.86	12.12	14.66	10.05	12.61	32.36	9.83	19.49
Variance	293.16	161.94	103.63	296.53	97.16	146.81	214.89	101.08	158.91	1046.97	96.66	379.72
Minimum	2.2	3.7	4.7	4.5	7.8	7.7	12.3	10.7	4.0	4.9	13.2	7.2
Maximum	76.2	56.2	43.9	78.0	50.8	53.6	72.8	47.3	49.1	165.1	42.4	87.5
Count	22	15	22	22	22	25	25	23	25	23	13	17

As can be seen from this table, if the October 6th exceedance day is removed from the data set, the average for the month of October drops almost 6 µg/m^3.

Table 3-5. Month and Year Goodland PM_{10} Monitoring Data Summary

Site	Goodland			
	October (with 10-6-11 data)	October (w/o 10-6-11 data)	2011 (with 10-6-11 data)	2011 (w/o 10-6-11 data)
Mean	37.2	31.4	25.1	22.2
Median	33.2	30.1	21.1	20.5
Mode	N/A	N/A	7.8	7.8
sd	32.4	16.8	24.9	14.6
Variance	1047.0	282.3	617.6	213.7
Minimum	4.9	4.9	2.2	2.2
Maximum	165.1	66.0	165.1	78.0
Count	23	22	50	49

Figure 3-2 is the overall frequency histogram. The histogram displays a well-formed density function, almost 90% of the samples values are less than 45 µg/m^3 and just over 99% of the samples are less than 80 µg/m^3.

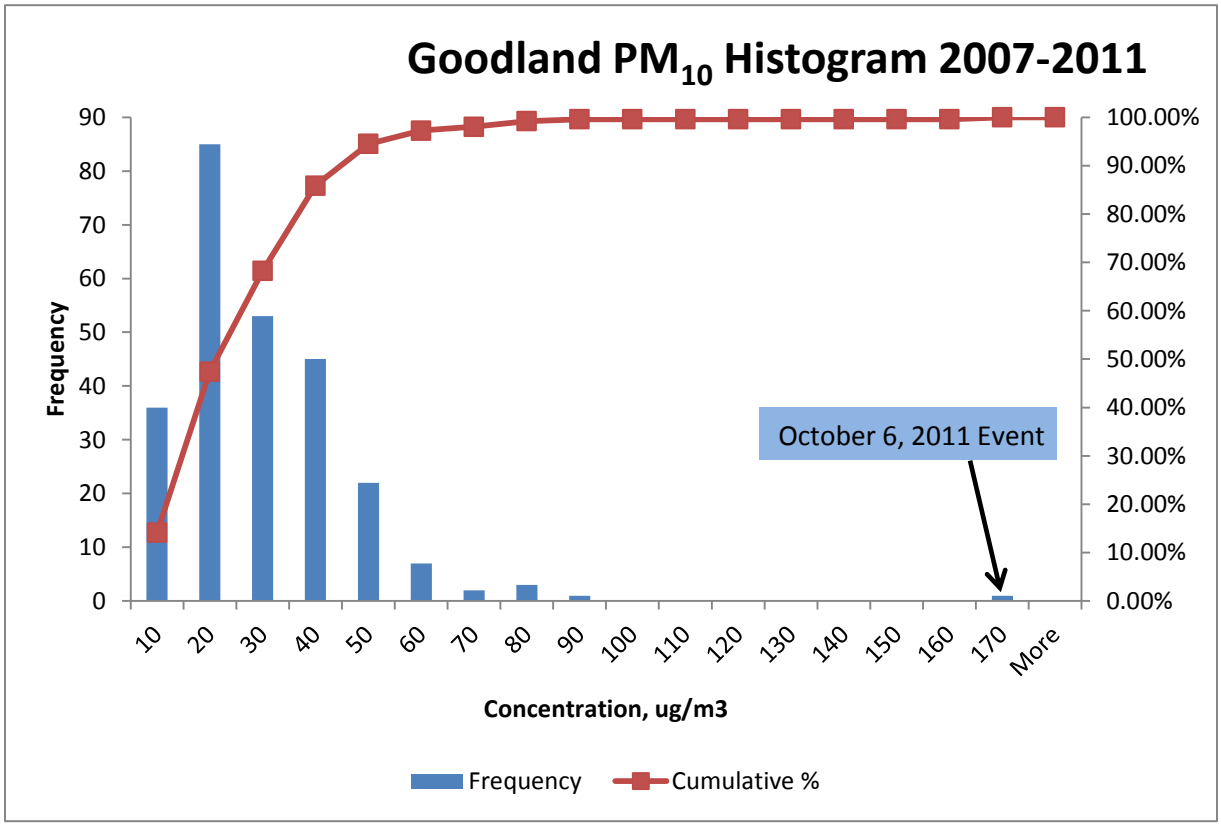

Figure 3-2. PM_{10} Histogram (2007-2011) at Goodland monitoring site

4. Not Reasonably Controllable or Preventable

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be "not reasonably controllable or preventable" in order to be defined as an exceptional event. This requirement is met by demonstrating that despite reasonable agricultural control measures in place within Sherman County and the Goodland area, high wind conditions overwhelmed all reasonably available controls. The event occurring on October 6, 2011 was directly related to strong and gusty winds generated by an intense low pressure system and its accompanying cold front. The strong winds overwhelmed all reasonably available controls, and were also responsible for transporting PM into the Goodland area from areas outside of the region. As explained in the conceptual model, an intense low pressure system and its associated strong and gusty winds, in tandem with extremely dry conditions across the region lead to a region wide dust storm across several states. As shown in Section 5, the source region for this event and the associated transported dust on October 6, 2011, came from areas outside of the Goodland area; primarily from southeast Colorado and extreme southwest Kansas. While it is likely that dust was generated within the Goodland area as strong winds and gusts from the low pressure system and its cold front passed through the area, the amount of dust generated locally was easily overwhelmed by, and largely unnoticeable as compared to the dust transported in from the source regions. Controls on local agricultural sources of fugitive dust were in place and implemented during the event of October 6, 2011, but were not capable of controlling transported dust (PM_{10}) raised by the gusty and turbulent winds on this date.

The following section describe the Best Available Control Measures (BACM) in place during the event of October 6, 2011. The Goodland monitor has never violated the PM_{10} standard so the area is currently in attainment for the PM_{10} NAAQS. There are therefore no stringent PM_{10} regulations in place in Goodland, Sherman County or the region around the monitoring site. There is only one regulated point source located in the county and it produces under 6 tons of PM_{10} per year.[1] Inspections of local potential sources performed before, during and after the event of October 6, 2011, confirmed that no unusual anthropogenic PM_{10} producing activities occurred in Sherman County, the Goodland area, nor the local areas surrounding the exceeding monitor.

The following have been identified as potential sources of blowing dust during high wind events in Kansas.

a) Tilled agricultural land;
b) sparsely vegetated or overgrazed range land;
c) unpaved roads and parking lots;
d) urban paved roads; and
e) construction sites

The following have been identified as standard soil conservation measures which constitute agricultural BACM.

a) Reduced tillage farming practices;
b) tree rows;

[1] A sunflower seed processing plant in Goodland, Kansas, that produces crude vegetable oil and meal from sunflower seeds.

c) other physical windbreaks;
   1) grass barriers;
   2) annual (e.g., sunflower) barriers;
   3) buffer strips; and
   4) “snow” fences;
d) cover crops;
e) strip cropping;
f) crop residues; and
g) emergency tillage

Soil erosion specialists at the federal and state levels have been working for approximately seventy five years to develop and evaluate potential mitigating measures. These soil conservation experts continue to implement measures that prove effective for the reduction or prevention of blowing dust. Numerous measures have been applied and are currently in place across Kansas in order to minimize the effects of wind erosion. The United States Department of Agriculture - Agricultural Research Service (USDA-ARS) Wind Erosion Research Unit (WERU) located at Kansas State University (KSU) has achieved the following:

a) Evaluated emergency till practices and demonstrated their effectiveness in halting wind erosion as it started;
b) Evaluated vegetative and non-vegetative mulches and demonstrated that standing vegetation can be five to ten times more effective at reducing wind erosion than material laying flat;
c) Evaluated the relative effectiveness of different plant species in windbreaks;
d) Established the use of feedlot wastes as an effective method for erosion control; and
e) Established the use of permanent grass wind barriers and annual crop control strips, and evaluated the relative effectiveness of their spacing, position, and size in reducing wind erosion.

The area south and southwest of Goodland, extending into northwestern Oklahoma and southeastern Colorado, is natural grassland and farmland, much of which is planted in wheat (Figure 4-1). During 2011, this area was experiencing drought conditions (Figure 2-8). The drought-induced decrease in vegetative cover due to dry grassland and poor crop production resulted in increased exposure of topsoil. As a result of the increasingly dry topsoil, bare areas were covered with a layer of fine loose granules (crustal dust).

USDA: Natural Resources Conservation Service (NRCS)

1. *Conservation Reserve Program*

Sherman County is a predominately agricultural area that is made up of 675,698 acres of land area – 657,942 acres (or 97.3%) of which is land in farms. Of the farm land acreage, cropland accounts for almost half of the total (323,248 acres). Water, and often the lack of it, coupled with the frequent high winds experienced during late fall and early spring can destroy crops, encourage pests, and damage soil surfaces lending them susceptible to wind erosion.

Most of Sherman County cropland acreage is farmed using dryland practices (versus irrigated) and consists of soils classified as highly-erodible-land (HEL) by the Department of Agriculture.

Recognizing the problems associated with erodible land and other environmental-sensitive cropland, the U.S. Department of Agriculture (USDA) included conservation provisions in the Farm Bill. This legislation created the Conservation Reserve Program (CRP) to address these concerns through conservation practices aimed at reducing soil erosion and improving water quality and wildlife habitat.

The CRP encourages farmers to enter into contracts with USDA to place erodible cropland and other environmentally-sensitive land into long-term conservation practices for 10-15 years. In exchange, landowners receive annual rental payments for the land and cost-share assistance for establishing those practices.

The CRP has been reasonably successful in Sherman County by placing approximately 39,024 acres of Sherman County cropland, or 12% of total cropland, under contract. Most of this land has been planted with a perennial grass cover to protect the soil and retain its moisture.

While the following initiatives are not meant to be enforceable, many efforts are underway that further reduce blowing dust and its impacts. These include:

- The CRP has moved to include all available area lands into area contracts. Success of the CRP initiatives is measured through ongoing monitoring of the contracts to ensure ample grass coverage to minimize blowing dust.
- CRP sends out information several times per year through radio and the area newspaper to further reach farmers interested in topsoil protection.
- In response to the significant Colorado drought the CRP is working with multiple parties in extensive annual planning efforts to limit blowing dust and its impacts. These planning efforts change year to year depending on the severity of the drought.

2. New Initiatives

While the following initiatives are not meant to be enforceable, the Natural Resources Conservation Service has many efforts underway in western Kansas that further reduce blowing dust and its impacts. These include:

- A comprehensive rangeland management program;
- Tree planting program;
- Drip irrigation purchase program, and;

A multi-party drought response planning effort coordinated through the State of Kansas Governor’s office.

KANSAS STATE UNIVERSITY EXTENSION OFFICE

While the following initiatives are not meant to be enforceable, the KSU Extension Office has many efforts underway in western Kansas that further reduce blowing dust and its impacts. These include:

- Crop residue efforts that encourage no- or low-till practices. These have been deemed appropriate and useful in reducing blowing dust.
- Ongoing outreach efforts to educate area agricultural producers on soil management programs. These include one-on-one visitations and annual meetings with various corn and wheat programs to discuss crop management.
- Drought workshops to protect topsoil throughout the county.

The Goodland, Sherman County area was influenced by high winds and blowing dust from the south and southwest on the day of the recorded PM_{10} exceedance. Considering the wind speeds and gusts noted during the day that the concentration above the 24-hour NAAQS was recorded (Table 1-1), it is apparent that these conditions were abnormal. The phenomena which gave rise to these blowing dust problems were, therefore, natural events which could not be prevented by application of BACM. With the top few inches of soil loose and the strength and short duration of this event, the farming community was unable to apply emergency tillage or other measures to aid in the reduction of blowing dust. In fact, these events occurred in spite of general area-wide application of accepted good agricultural soil conservation practices.

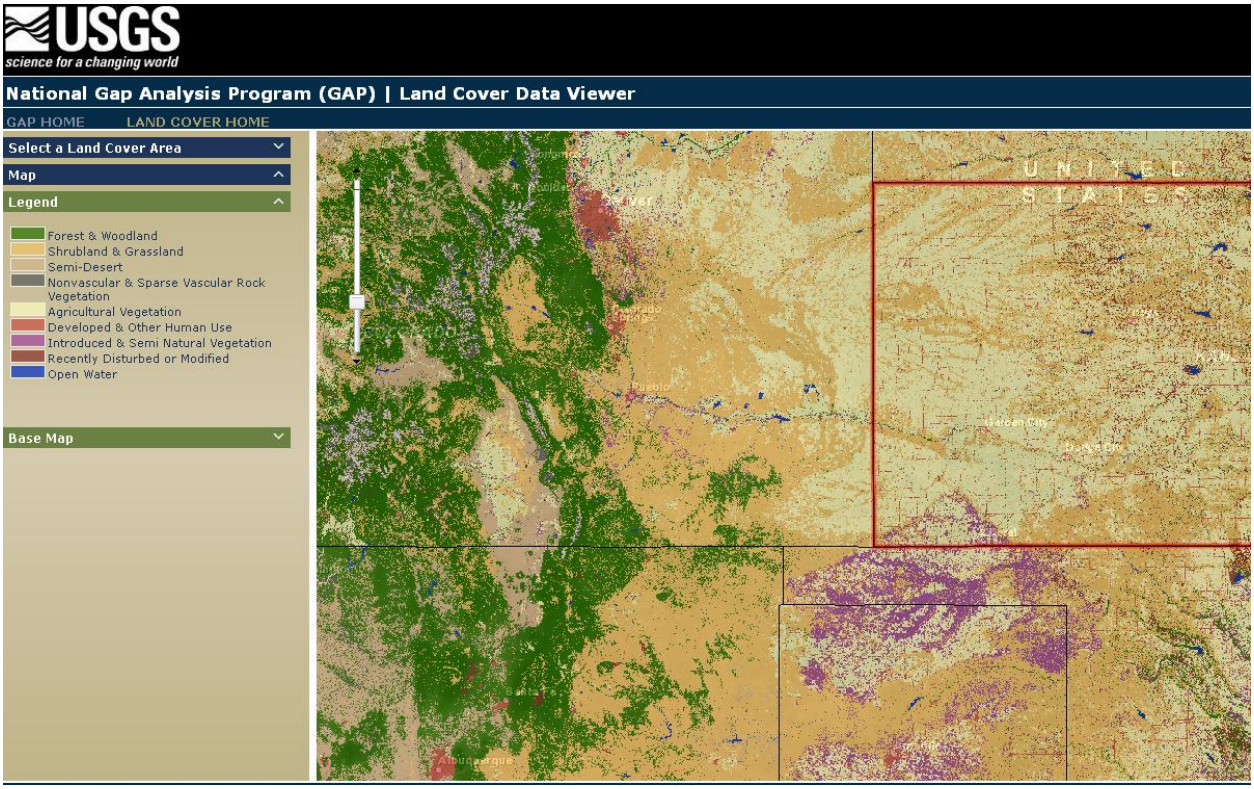

Figure 4-1. Regional (KS, OK, TX, CO, NE, NM) Land Cover Data Map (USGS)

On the basis of these findings, KDHE has concluded that the Goodland area or Sherman County could not have prevented these exceedances at the recorded particulate levels by employing additional localized urban or rural control measures. The increase in PM_{10} concentration on the day of the recorded exceedance was 525% above normally observed levels. The October 6, 2011 value of 165.1 $\mu g/m^3$ at the monitoring site does not relate to the annual mean of 24.8 $\mu g/m^3$ or the monthly mean of 31.4 $\mu g/m^3$ at that site (Table 3-1 and Table 3-5). The fact that this was a natural event involving strong low pressure and associated frontal winds that transported PM_{10} emissions into Sherman County, with a majority of the PM_{10} emissions recorded by the Goodland monitor coming from sources outside of the Goodland area, provides strong evidence that the event and exceedance of October 6, 2011 recorded in the Goodland area was not reasonably controllable or preventable.

5. Clear Causal Relationship

5.1 Summary of Results

This section demonstrates the causal relationship between the strong winds associated with an intense storm system and PM_{10} concentrations above 150 µg/m^3 that occurred in Goodland, Kansas on October 6, 2011. In particular, this section provides evidence that (1) a large area wide dust storm affected the Goodland monitor site; (2) Dust (PM_{10}) from areas outside of the Goodland area was transported to the impacted monitor on the day when the 24-hour PM_{10} concentration was above 150 µg/m^3; and (3) the dust storm led to concentrations above 150 µg/m^3. This evidence includes discussion of source locations, meteorological conditions, satellite observations of dust, dust transport, and air quality data on the day when the 24-hour PM_{10} concentration was above 150 µg/m^3.

Meteorological and air quality data show that the 24-hour PM_{10} concentration exceeding the NAAQS in Goodland, Kansas was caused by dust from intense winds associated with a strong storm system moving through the area on October 6, 2011 (based on source locations relative to the impacted monitor, wind patterns favorable for transport of dust to the impacted monitors, and reduced visibilities with dust reported in the vicinity of the impacted monitor).

5.2 Analysis Methods

Several analysis methods were used to assess whether the 24-hour PM_{10} concentrations above 150 µg/m^3 were caused by this dust storm. Source locations were analyzed in relation to the impacted monitor, and meteorological data were evaluated to determine whether conditions were favorable for transport of dust (PM_{10}) to the impacted monitor. Air quality data and visibility observations were used to assess whether dust was present at the impacted monitor.

5.2.1 Other Unusual Emissions

In addition, KDHE has reviewed media documents, and contacted local agency and KDHE district staff regarding the October day that is the subject of the exceptional event request and are unable to find any emergency conditions or other anthropogenic events that occurred on the day that would potentially cause the high particulate matter readings on the day in question.

5.2.2 Meteorological Conditions and Dust Transport

Dust transport was analyzed by reviewing surface wind observations and model air parcel trajectories.

For surface wind analysis, data from METAR sites nearest the impacted monitors were assessed. Table 5-1 shows the pairings of air quality monitors to METAR sites used throughout this report to examine meteorological conditions near the air quality monitors. METAR sites

were selected because of their known high data quality. In some locations, the nearest METAR site was located several miles from the impacted air quality monitor. However, meteorological conditions on the dust storm event day was driven by a large-scale storm (e.g., regionally homogeneous). Thus, meteorological conditions observed at the METAR sites were likely very similar to conditions at the air quality monitors. In addition, no other reliable sources of meteorological data were available. Vector winds averaged over several hours were used in this analysis because they represent pollution transport better than scalar winds. These vector winds, along with other meteorological parameters (e.g., temperature), were evaluated with surface and upper-level observations, radar, and satellite maps to obtain a comprehensive view of the meteorological pattern on the day when the 24-hour PM_{10} concentration was above 150 $\mu g/m^3$.

Table 5-1. METAR sites used to represent meteorological conditions near air quality monitors with high particulate matter concentrations.

Air Quality Monitors	METAR Site	METAR Site Location	Approx. Distance Between Air Quality and METAR Stations
Goodland	KGLD	Renner Field/Goodland Municipal Airport, Goodland, KS	1.6 miles
Dodge City	KDDC	Dodge City Regional Airport, Dodge City, KS	4 miles
Prowers, Lamar, CO	KLAA	Lamar Municipal Airport, Lamar, CO	4 miles
Gothenburg, NE	KLXN	Jim Kelley Field, Lexington, NE	22.5 miles
Cozad, NE	KLXN	Jim Kelly Field, Lexington, NE	12.3 miles

Atmospheric soundings from KDDC (Dodge City, Kansas) and KAMA (Amarillo, Texas) were used to identify temperature inversions and mixing layers. These features were assessed to determine whether dust at the surface remained in the lower levels of the atmosphere rather than mixing into aloft layers where it would not impact surface air quality monitors. Also these soundings were used to determine if high winds located above the surface but below the inversion were able to mix downward to the surface on October 6, 2011. Confirming that the dust would likely remain in the lower levels of the atmosphere by reviewing the soundings also provided guidance on which trajectory levels were appropriate to assess dust transport.

The Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) was used to create backward trajectories ending at the impacted monitor. Trajectories ending at 50, 500, and 1500m above the impacted monitor was modeled to show flow patterns throughout the surface-based mixed layer where dust was likely present. Trajectory heights above the surface were also examined over the course of each trajectory path to determine whether dust remained

near the surface (e.g., near the impacted monitor). Trajectory images were created at two-hour intervals during the 24-hour window contributing to the 24-hour PM_{10} concentrations above 150 µg/m^3 at the Goodland monitor; the entire suite of trajectories created can be found in Appendix C.

5.2.3 Air Quality Conditions

Time-series of air quality and meteorological parameters were analyzed to assess the presence of dust at the impacted monitors. Specific meteorological conditions (such as dust or haze) reported at airports by human observers were considered.

5.3 Findings

This subsection contains the results of the causal relationship demonstration for the day when the 24-hour PM_{10} concentrations were elevated or above 150 µg/m^3. Potential source locations, meteorological conditions and dust transport, and air quality conditions are described for the event day.

October 6, 2011

The results below demonstrate that a regional dust storm caused the 24-hour PM_{10} concentrations above 150 µg/m^3 at the Goodland monitor on October 6, 2011. Factors supporting this conclusion include:

- Low-level winds and model trajectories showing transport of dust to the impacted monitors.
- Reductions in visibility, increases in PM concentrations, and visual reports of dust at or near the impacted monitors.
- 24-hour PM_{10} concentrations below 150 µg/m^3 at monitors that were not impacted by dust.
- No other unusual emission sources that would have caused the high PM_{10} concentrations.

Meteorological Conditions and Dust Transport

This exceedance and the elevated readings were the consequence of several days of strong gusty winds ahead of a deep low pressure with a trailing cold front, in combination with dry conditions which caused significant blowing dust across parts of Colorado, Oklahoma, and western Kansas. The prefrontal winds were the result of two 993-millibar surface low pressure system centered over western Wyoming and eastern Utah with a cold front trailing to the south as shown in the 12Z October 6, 2011 (5a.m. MST October 6, 2011) surface analysis in Figure 5-1. The low pressure over Utah intensified and moved to the northeast into western Nebraska as shown in the 0Z October 7, 2011 (5p.m. MST October 6, 2011) surface analysis in Figure 5-2. The cold front associated with this system was approaching western Kansas.

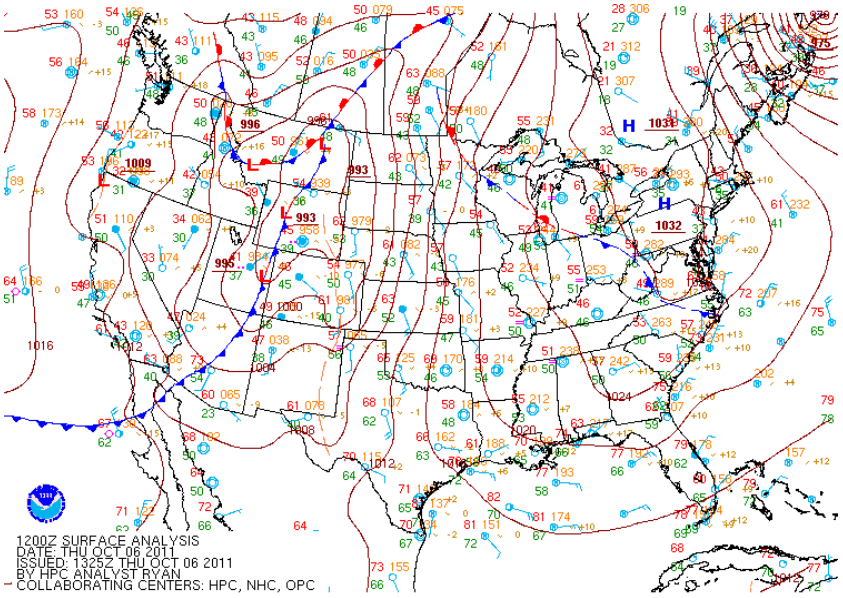

Figure 5-1. Surface analysis for 12Z October 6, 2011 (5a.m. MST October 6)(Hydrometeorological Prediction Center)

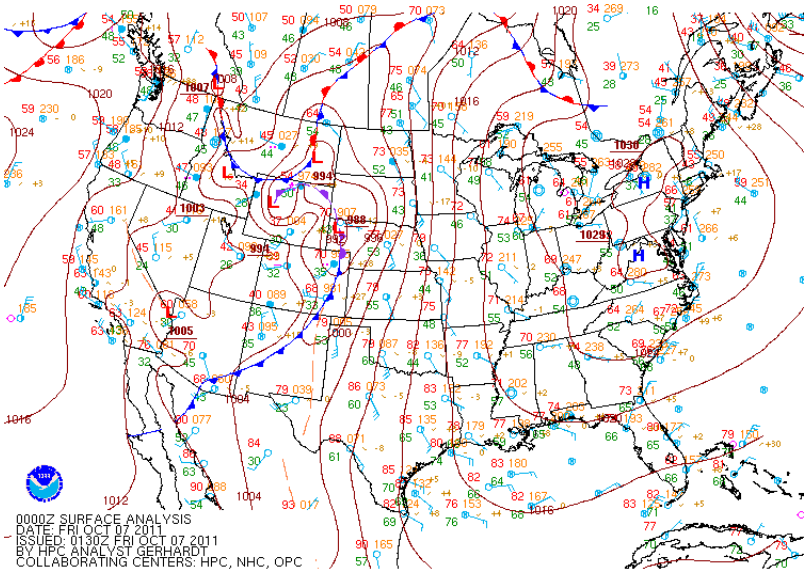

Figure 5-2. Surface analysis for 00Z October 7, 2011 (5p.m. MST October 6)(Hydrometeorological Prediction Center)

These surface features were associated with a strong upper level low moving into the Great Basin which is shown in Figure 5-3, the 500-millibar analysis for 12Z October 6, 2011

(5a.m. MST October 6, 2011). There was a localized wind maximum of 70 to 90 knots over southern California which was rotating around the base of this upper level low. Once the morning inversion broke, the momentum associated with these winds would have mixed down to the surface and enhance the prefrontal winds associated with the strong low pressure systems and cold front in Figure 5-3. Strong southerly winds continued blowing across the southern and central Great Plains, with sustained winds now reaching over 32kts (37mph) in portions of western Kansas and eastern Colorado and a large area over 30kts (35mph) stretching from the northeast New Mexico through southwest Nebraska (Figure 5-4).

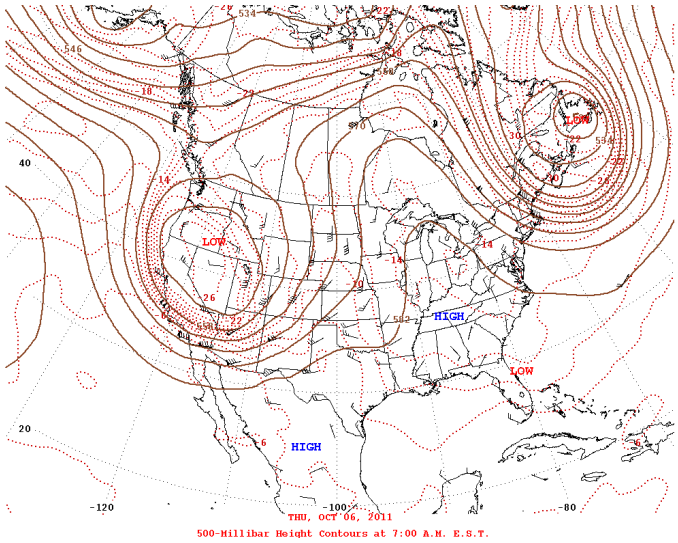

Figure 5-3. 500 mb analysis for 12Z October 6, 2011 (5a.m. MST October 6) (NCDC)

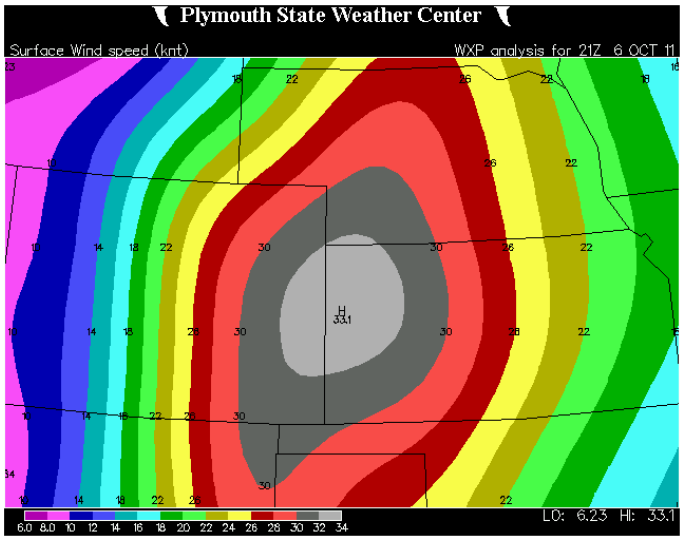

Figure 5-4. Surface wind speed (kts) for 21Z October 6, 2011 (2p.m. MST October 6)(Plymouth State Weather Center)

The October 7, 2011, 00Z (5p.m. MST October 6) soundings at Amarillo, TX and Dodge City, KS, in Figures 5-5 and 5-6, respectively, show good vertical mixing to near 700 millibars in Amarillo and 800 millibars in Dodge City . These two soundings are in the area that experienced the strong gusty surface winds on October 6, 2011. Vertical mixing below the inversions would have brought the strong winds in the 700-800 millibar speed maximum down to the surface. The combination of the mixing and the tight surface pressure gradient caused sustained surface winds of 30 to 40 mph with gusts of 35 to 60 mph. Winds of this strength will cause blowing dust if soils are dry. Sustained daily averaged wind speeds of 20 mph or greater, hourly averaged wind speeds greater than 25 mph and gusts of 40 mph or higher have been shown to cause blowing dust in western Kansas (*State of Kansas PM_{10} Natural Events Action Plans (NEAP) for Morton and Sedgwick Counties*- Appendix E).[2]

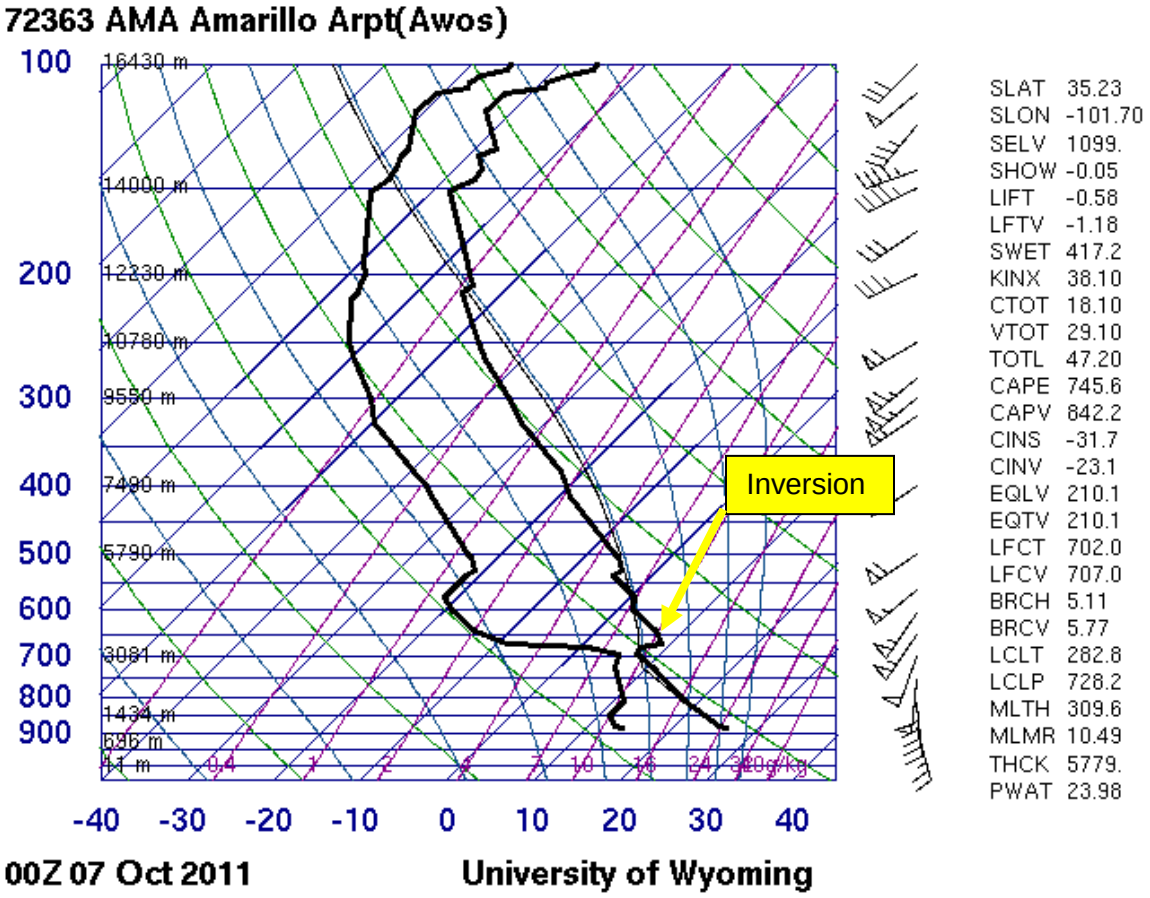

Figure 5-5. Amarillo, TX sounding analysis for 00Z October 7, 2011, or 5p.m. MST October 6, 2011, (from the University of Wyoming's archive of National Weather Service soundings)

[2] With the promulgated Exceptional Events Rule (EER) in place, the EER superseded previous natural events guidance including NEAPs (that were not approved as part of a SIP).

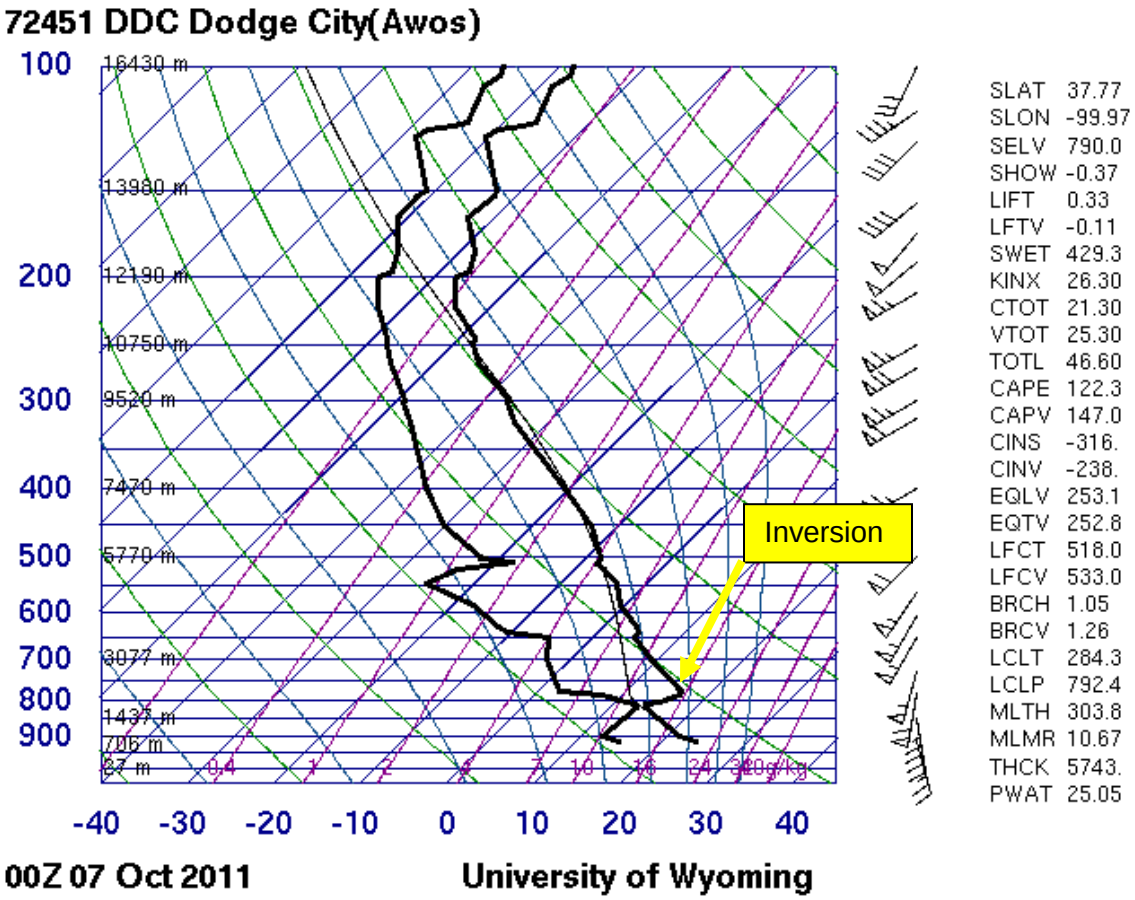

Figure 5-6. Dodge City, KS sounding analysis for 00Z October 7, 2011, or 5p.m. MST October 6, 2011, (from the University of Wyoming's archive of National Weather Service soundings)

The Dodge City upper air sounding also shows a strong inversion at 800 millibars that would have capped the atmosphere and any dust that was lifted into the air from this storm system would have remained below this layer.

Tables 5-2 through 5-5 show the National Weather Service observations for the four sites of Goodland, Dodge City (about 143 miles southwest of Goodland), Lamar, CO (about 100 miles south southwest of Goodland), and Lexington, NE (about 143 miles to the northeast of Goodland). National Weather Service high wind watches, warnings and dust warnings for the area for October 6 are also shown in Appendix B. The observations show that winds in excess of the thresholds identified for elevated PM_{10} in blowing dust (*State of Kansas PM_{10} Natural Events Action Plans (NEAP) for Morton and Sedgwick Counties*- Appendix E) occurred across the area. Hourly averaged sustained winds of 25 mph or greater, wind gusts of 40 mph or greater, reduced visibility, and the weather type of "haze" are highlighted in yellow.

Table 5-2. Wind and Weather observations for Goodland, KS for October 6, 2011 (NCDC). Speeds at or above the blowing dust thresholds and haze and reduced visibility (caused by dust) have been highlighted in yellow

Time in MST October 6	Temperature Degrees F	Relative Humidity in %	Wind Speed in mph	Wind Gust in mph	Wind Direction in Degrees	Weather	Visibility in Miles
53	60	81	26	38	170	cloudy	10
153	61	81	30	40	170	cloudy	10
253	60	84	29	40	170	cloudy	10
353	60	84	25	38	170	cloudy	10
453	59	87	28	38	180	ptcloudy	10
553	60	84	25	37	180	ptcloudy	10
653	61	81	26	37	180	cloudy	10
753	63	75	26	39	180	ptcloudy	10
853	68	61	33	44	180	clear	10
953	70	57	36	46	170	clear	10
1053	76	42	36	52	180	clear	10
1153	80	35	43	55	170	ptcloudy	10
1253	83	26	39	58	180	cloudy	10
1353	83	30	34	49	170	cloudy	10
1453	80	37	34	51	170	cloudy	10
1553	77	47	39	53	160	cloudy	10
1653	73	55	38	52	160	cloudy	10
1753	72	59	31	49	180	cloudy	10
1853	69	68	33	45	160	cloudy	10
1910	64	78	29	49	170	VCTS	10
1917	63	93	20	60	180	+TSRA BR	1.75
1933	63	93	11	28	180	+TSRA BR	3
1953	58	97	25	34	180	VCTS	10
2010	57	93	20	25	200	VCTS	10
2053	56	80	9		210	clear	10
2153	59	44	8		210	ptcloudy	10
2253	55	59	10		210	cloudy	10
2353	55	51	11		230	ptcloudy	10

Table 5-3. Wind and weather observations for Dodge City, KS for October 6, 2011 (NCDC). Speeds at or above the blowing dust thresholds and haze and reduced visibility (caused by dust) have been highlighted in yellow.

Time in CST October 6	Temperature Degrees F	Relative Humidity in %	Wind Speed in mph	Wind Gust in mph	Wind Direction in Degrees	Weather	Visibility in miles
52	62	54	22	29	160	Cloudy	10
152	63	50	30	40	160	Cloudy	9
252	59	72	20	31	160	Cloudy	10
352	60	70	25	33	170	Ptcloudy	10
452	59	70	23	34	160	CLR	10
552	59	67	23	32	170	CLR	10
652	59	67	24	31	160	CLR	10
752	61	63	22	30	160	CLR	10
852	68	57	30	38	170	CLR	10
952	73	52	32	43	180	CLR	9
1052	76	48	32	46	180	Ptcloudy	9
1152	78	47	33	45	180	Ptcloudy	8
1252	79	47	39	48	170	CLR	8
1352	78	49	37	51	180	CLR	8
1452	77	50	38	52	170	CLR	7
1552	77	50	43	54	180	Ptcloudy	7
1652	76	54	40	46	160	Ptcloudy	9
1752	74	56	31	41	170	Ptcloudy	9
1852	74	56	24	39	170	Cloudy	9
1952	73	57	30	40	160	Ptcloudy	10
2052	72	59	32	40	160	CLR	10
2152	70	64	33	45	160	CLR	9
2252	70	61	33	43	160	CLR	10
2352	69	63	29	39	160	CLR	10

Table 5-4. Wind and weather observations for Lamar, Co for October 6, 2011 (NCDC). Speeds at or above the blowing dust thresholds and haze and reduced visibility (caused by dust) have been highlighted in yellow.

Time in MST October 6	Temperature Degrees F	Relative Humidity in %	Wind Speed in mph	Wind Gust in mph	Wind Direction in Degrees	Weather	Visibility in miles
53	62	81	22	33	160	CLR	10
153	62	78	20	28	180	CLR	10
253	61	81	14	23	180	CLR	10
353	61	81	30	39	180	CLR	10
453	60	84	29	37	170	CLR	9
553	61	70	29	37	180	CLR	10
653	62	65	29	38	180	CLR	10
753	67	55	20	31	180	CLR	10
853	74	37	33	45	180	CLR	10
953	78	30	37	46	190	CLR	10
1053	82	25	39	51	180	CLR	10
1153	85	17	38	51	180	CLR	10
1253	87	15	37	54	190	CLR	10
1353	87	17	39	51	190	FEW110	10
1453	85	16	37	49	200	FEW110	9
1553	84	16	39	49	200	FEW120	10
1653	82	18	36	46	200	SCT100	10
1753	81	18	28	40	200	BKN110	10
1817	70	27	28	40	270	FEW110	10
1853	67	26	24	33	270	SCT110	10
1953	63	28	11		260	FEW100 SCT120	10
2053	59	31	11		240	CLR	10
2153	55	36	11		220	CLR	10
2253	53	38	11		230	CLR	10
2353	49	44	8		200	CLR	10

Table 5-5. Wind and weather observations for Lexington, NE for October 6, 2011 (NCDC). Speeds at or above the blowing dust thresholds and haze and reduced visibility (caused by dust) have been highlighted in yellow

Time in CST October 6	Temperature Degrees F	Relative Humidity in %	Wind Speed in mph	Wind Gust in mph	Wind Direction in Degrees	Weather	Visibility in miles
55	63	63	18	26	160	CLR	10
155	63	63	20	28	160	Ptcloudy	10
255	61	67	16	22	150	Cloudy	10
355	59	72	16		150	Ptcloudy	10
455	57	78	14	21	140	Cloudy	10
555	55	83	13		150	Cloudy	10
655	59	78	24	32	160	Cloudy	10
755	59	84	22	28	150	Cloudy	10
855	61	78	25	33	150	Cloudy	10
1055	70	59	28	37	160	Ptcloudy	10
1155	73	53	28	44	160	CLR	10
1255	77	47	31	44	160	CLR	10
1355	81	41	33	41	160	CLR	10
1455	81	41	37	49	160	Ptcloudy	10
1555	81	44	32	47	160	Ptcloudy	10
1655	79	47	40	51	160	Ptcloudy	7
1755	77	50	30	41	160	CLR	7
1855	77	50	29	39	160	CLR	10
1955	73	53	31	37	160	Ptcloudy	10
2055	73	53	38	47	160	Ptcloudy	10
2155	72	55	33	41	160	Ptcloudy	10
2255	68	73	29	39	170	Cloudy	7
2355	64	90	26	32	280	Cloudy	3

Figures 5-7 and 5-8 show the output for blowing dust from the NAAPS (Navy Aerosol Analysis and Prediction System) Global Aerosol Model for October 6, 2011. The bottom panels in Figures 5-7 and 5-8 show where dust is blowing. They show a large area of blowing dust extending from west Texas through eastern Colorado and western Kansas and continuing northward into Canada. As the day progressed and wind speeds increased from the strong storm system approaching from the west, the concentration of dust increased dramatically across southeast Colorado and into southwest Kansas.

The NAAPS model output is based on soil moisture content, soil erodibility factors, and modeled meteorological factors conducive to blowing dust (a description of NAAPS see: http://www.nrlmry.navy.mil/aerosol_web/Docs/globaer_model.html).

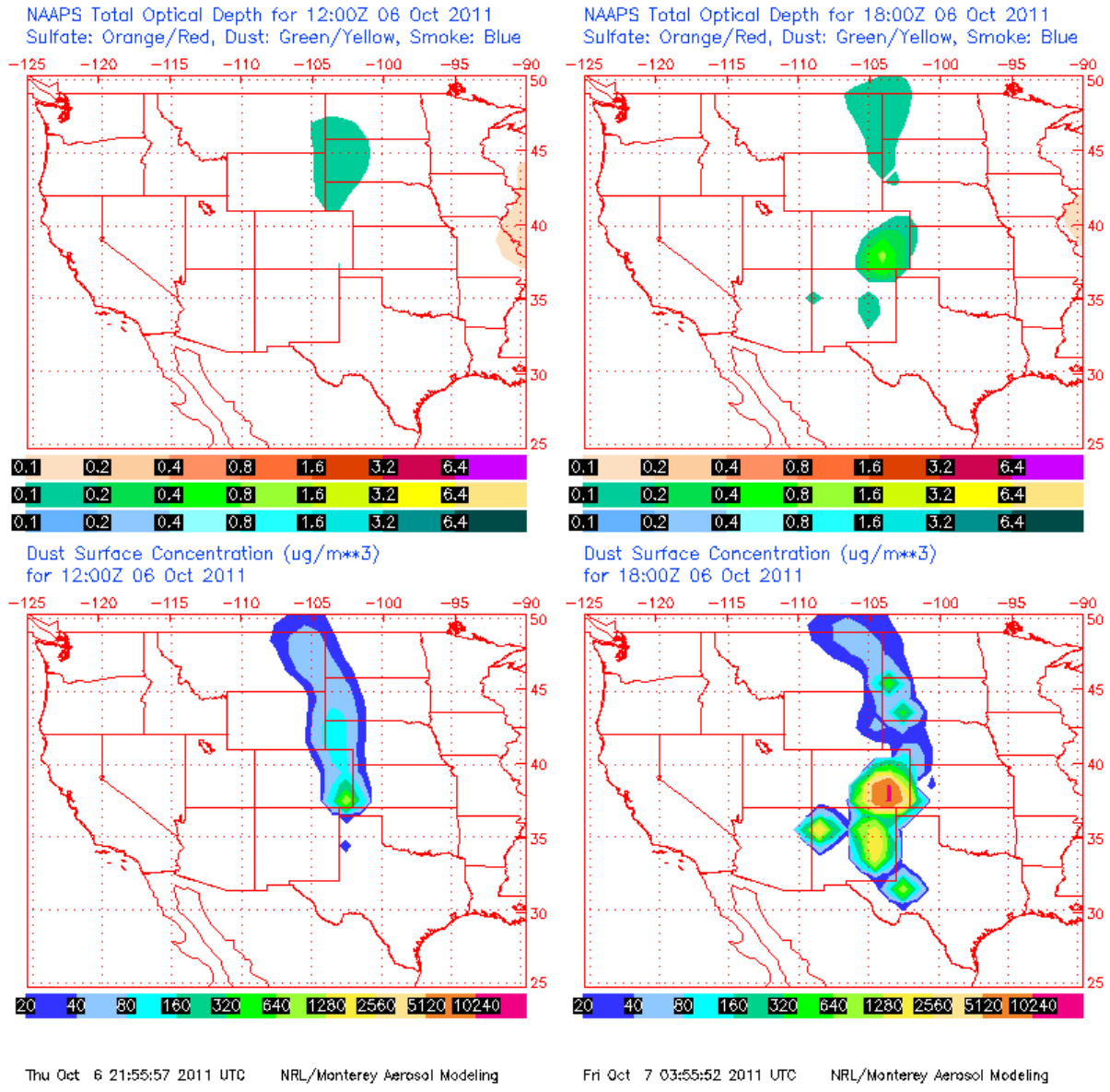

Figure 5-7. NAAPS forecasted surface dust concentrations and optical depth for 5a.m. and 11a.m. MST October 6, 2011 (NRL/Monterey Aerosol Modeling)

Although the NAAPS forecast products can over predict dust PM_{10}, they do provide an independent calculation of the potential for blowing dust and the spatial extent of blowing dust for this event. The highest NAAPS concentrations of dust PM_{10} are in southeast Colorado and extreme southwest Kansas. All of the products discussed here point to a widespread, regional-scale dust storm that originated in portions of southeast Colorado and extreme southwest Kansas and grew to cover parts of ten states.

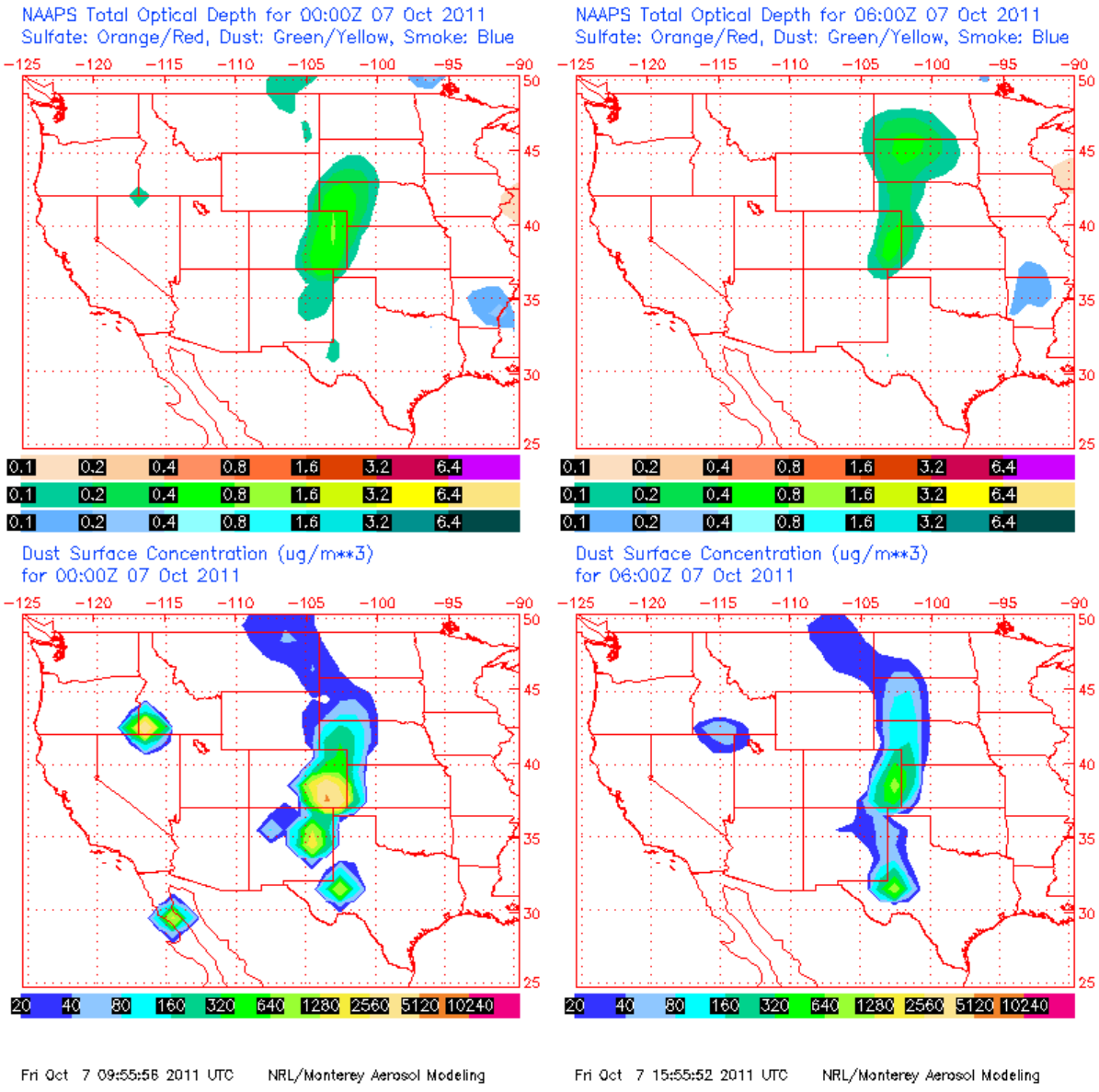

Figure 5-8. NAAPS forecasted surface dust concentrations and optical depth for 5p.m. and 11p.m. MST October 6, 2011 (NRL/Monterey Aerosol Modeling)

Figures 5-9 and 5-10 are images from the GOES visible satellite showing the on-going dust storm across parts of eastern Colorado and western Kansas. The two images were taken in the afternoon of October 6, 2011 when the strongest winds were being recorded at various METAR sites across the region. In fact, the winds in Goodland during the times that this images were acquired where blowing from the south near 40mph with gusts between 53-58mph.

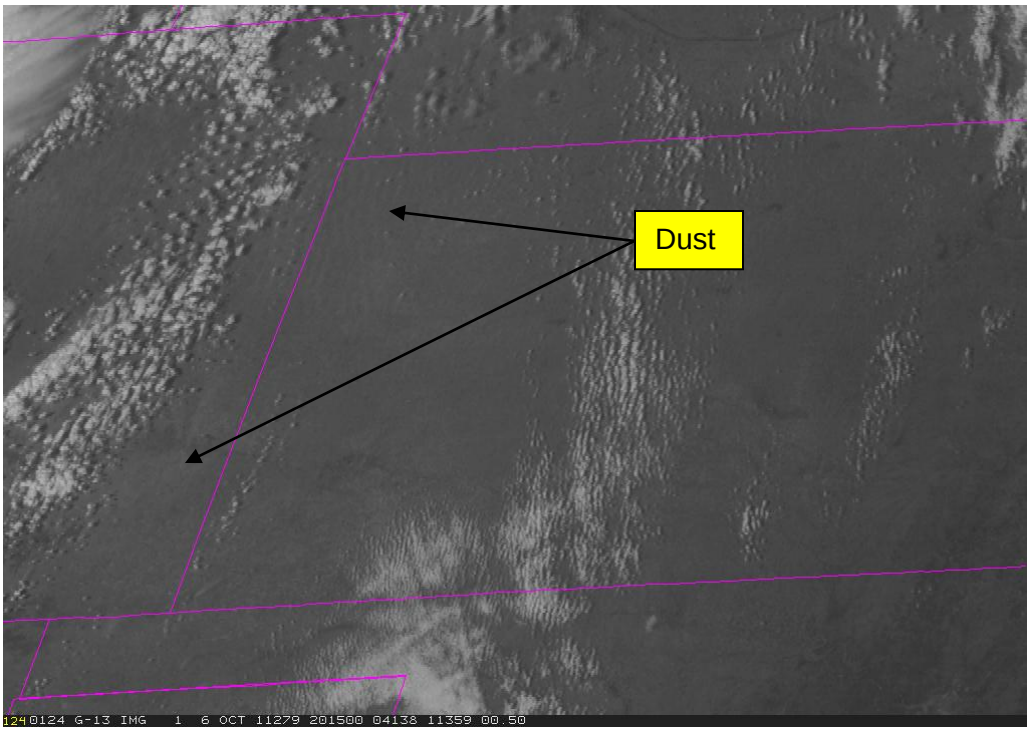

Figure 5-9. GOES visible satellite image showing ongoing dust storm @ 2015Z (1:15PM MST) October 6, 2011. (NASA)

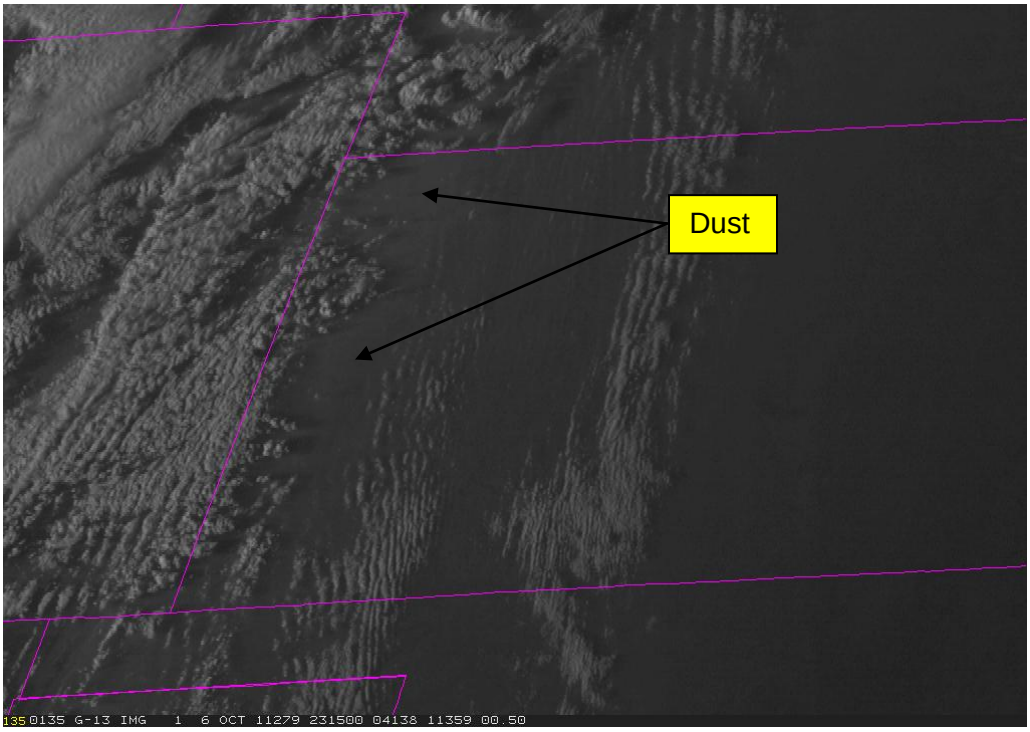

Figure 5-10. GOES visible satellite image showing ongoing dust storm @ 2315Z (4:15PM MST) October 6, 2011. (NASA)

Figure 5-11 contains back trajectory plots for Goodland during the peak period of winds and reduced visibilities. These back trajectories are from the NOAA HYSPLIT model using high-resolution NAM12 meteorological input data (http://ready.arl.noaa.gov/HYSPLIT.php). The back trajectory paths in southeast Colorado, far western Oklahoma, and Texas are completely consistent with the Goodland Exceptional Event, October 6, 2011 observed dust in the GOES imagery. Again, this shows a clear causal relationship between the dust in the source region and Goodland PM_{10} concentrations.

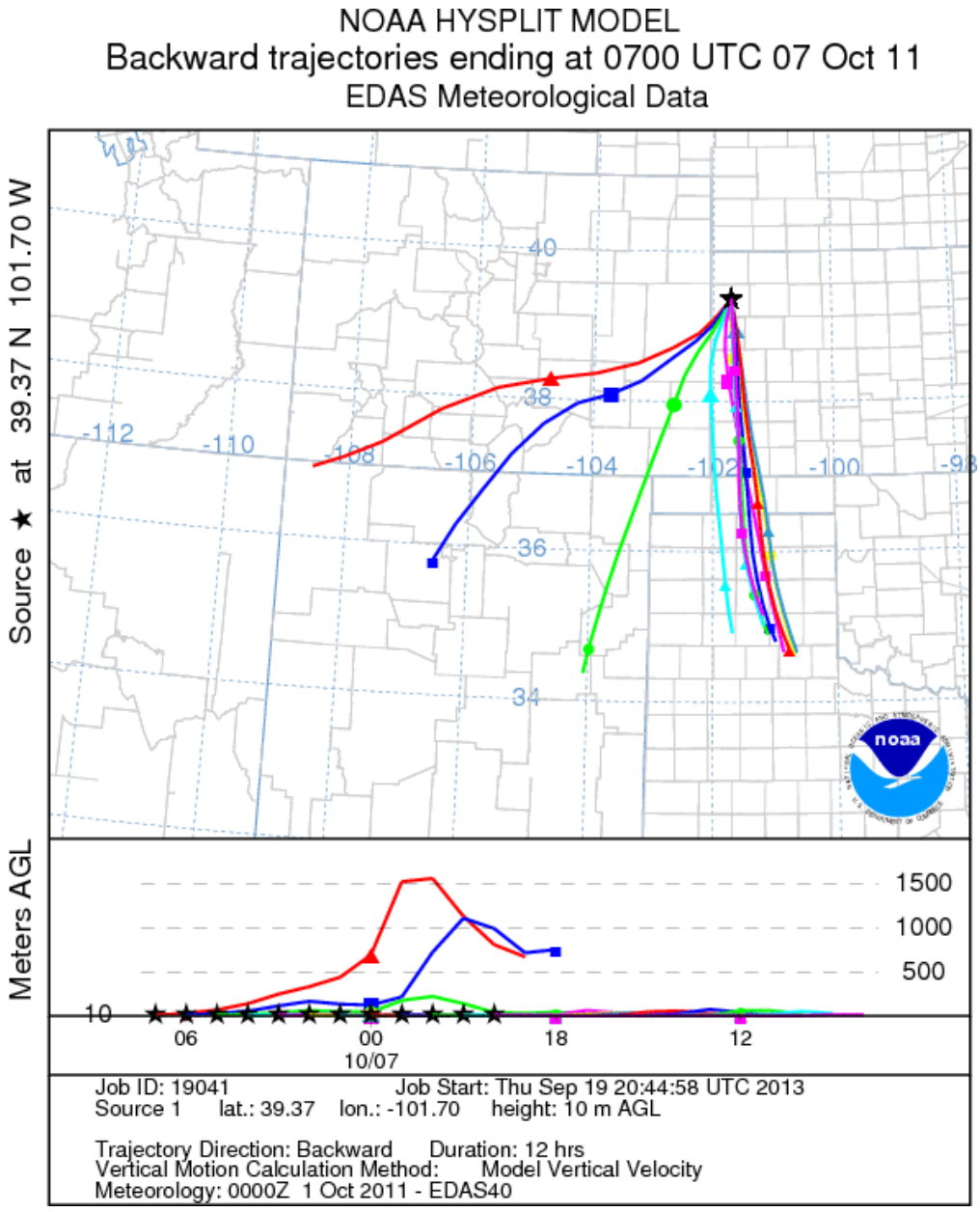

Figure 5-11. NOAA HYSPLIT 12-hour back trajectory plots for each hour during the windiest period on October 6, 2011. The HYSPLIT model run was based on data from the high-resolution 12-kilometer grid spacing NAM numerical weather model.

An analysis of the annual frequency of dust storms (Orgill and Sehmel, 1976) in the western half of the U.S. suggests that large areas of eastern Colorado, western Kansas, Texas, New Mexico and Arizona are source regions for blowing dust (see Figure 5-12). The back trajectories in Figure 5-11 cross these source areas and suggest that dust from upwind states can contribute to PM_{10} concentrations at Goodland during regional high-wind events.

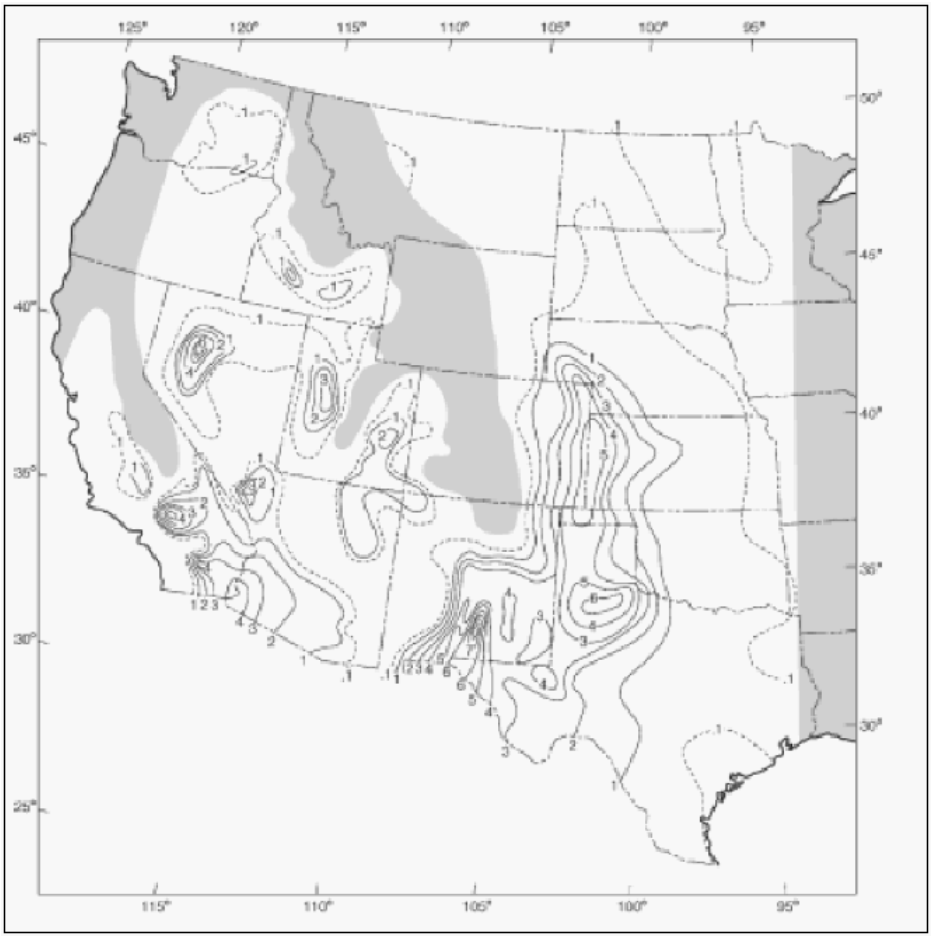

Figure 5-12. Number of dust storms per year from: Orgill, M.M., Sehmel, G.A., 1976. Frequency and diurnal variation of dust storms in the contiguous USA. **Atmospheric Environment 10**, 813–825.

The PM_{10} exceedance at Goodland on October 6, 2011, would not have occurred if not for the following: (a) dry soil conditions over eastern Colorado, western Kansas, western Oklahona and all of Texas; and (b) the tight surface pressure gradient and strong upper level winds mixing to the surface that led to strong gusty surface winds over eastern Colorado, western Kansas, western Oklahoma, northern Texas and western Nebraska. Clearly the PM_{10} exceedance at Goodland are due to an exceptional event associated with regional windstorm-caused emissions from erodible soil sources over a large area of eastern Colorado, western Kansas and Oklahoma and northern Texas, and these sources are not reasonably controllable during a significant regional windstorm under abnormally dry or moderate to severe drought conditions.

6. "But For" Analysis

Section 50.14(c)(3)(iv)(D) in 40 CFR part 50 requires that an exceptional event demonstration must satisfy that "[t]here would have been no exceedance or violation but for the event." The prior sections of this submittal have provided detailed information that the exceedance at the Goodland monitor on October 6, 2011 was not reasonably controllable or preventable and there is a clear causal relationship between transported PM_{10} from very strong winds associated with an intense storm system originating in areas outside of the Goodland area and the measured exceedance at the Goodland monitor. The weight of evidence in these sections demonstrates that but for the existence of emissions generated by these very strong winds and associated transported PM_{10}, there would have been no exceedances of the 24-Hour PM_{10} standard.

As detailed in Section 4, all reasonable agricultural control measures were in place and actively employed before, during, and after the exceedance of October 6, 2011. Local regulatory agencies, industry and the general public were alerted to the possibility of dust storms due to very strong winds through daily forecasts and media reports. On the ground observations recorded during the events consistently identify transported or re-entrained PM_{10} (dust) as the cause of the elevated concentrations near the exceeding monitor.

As shown in Section 5, detailed maps establish a clear causal relationship between the arrival of emissions generated by very strong winds associated with a intense storm system and elevated PM_{10} concentrations at the monitor. Multiple, independent measurements of wind speed, wind direction, and visibility all point to the presence of very strong winds as the delivery vehicle for transported PM_{10} into the Goodland area. The source regions for the transported PM_{10} are clearly identified as areas to the south and southwest of the Goodland area, especially in southeast Colorado.

Figure 6-1 shows the monitored values recorded at the Goodland monitor before and after the event of October 6, 2011. As you can see from the graph, PM_{10} readings were significantly below the reading of October 6 and are more in line with expected average PM_{10} readings from this monitor in October. This is another piece of evidence that this event or exceedance would not have occurred but for the very strong winds associated with the storm system that moved through the area on October 6, 2011.

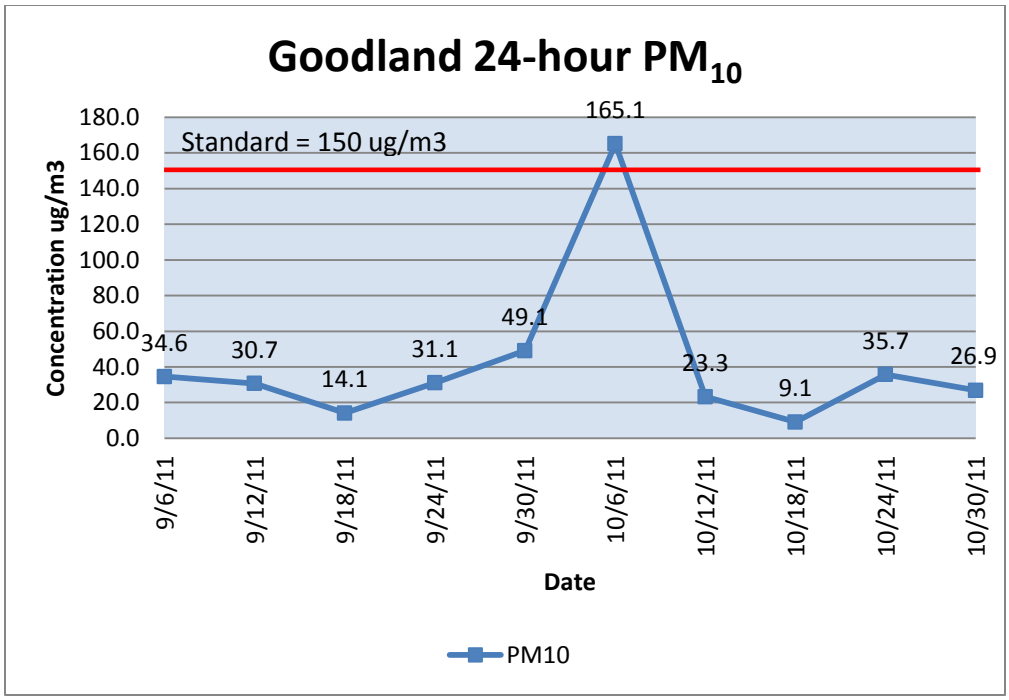

Figure 6-1. Goodland PM_{10} reading from September 6, 2011 to October 30, 2011

An estimation of PM_{10} due to the event is presented here and in Table 6-1. Based on the entirety of data in the Historical Fluctuations section, a conservative estimate of the "typical" values in October would have been between 41.1 and 45.1 µg/m^3 (corresponding to the 75th and 85th Percentile values) for the Goodland monitor. Using these conservative values as "typical" would indicate that the event provided an additional 120 – 124 µg/m^3 for the Goodland monitor.

Table 6-1. Typical October PM_{10} Values for Goodland

Site	Event Day Concentration (µg/m^3)	October Median (µg/m^3)	October Average (µg/m^3)	Oct. 75th % (µg/m^3)	Oct. 85th % (µg/m^3)	Est. Concentration Above Typical (µg/m^3)
Goodland	165.1	30.1	31.4	41.1	45.1	120-124

The body of evidence presented in this submittal provides no alternative that could tie the exceedance of October 6, 2011 to any other causal source but transported and re-entrained PM_{10} generated from very strong winds associated with an intense storm system, confirming that there would have been no exceedance but for the presence of these uncontrollable natural events.

7. Conclusions

The exceedance that occurred on October 6, 2011 satisfies the criteria of 40 CFR 50.1(j) and meets the definition of an exceptional event. These criteria are:

- The event affects air quality.
- The event is not reasonably controllable or preventable.
- The event is unlikely to reoccur at a particular location or [is] a natural event.

A. Affects Air Quality

As stated in the preamble to the Exceptional Events Rule, the event in question is considered to have affected air quality if it can be shown that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in Sections 2, 3, 4 and 5, we can reasonably conclude that the event in question affected air quality.

B. Not Reasonably Controllable or Preventable

Section 50.1(j) of Title 40 CFR Part 50 requires that an event must be "not reasonably controllable or preventable" in order to be defined as an exceptional event. This requirement is met by demonstrating that despite reasonable agricultural control measures in place within Sherman County and the Goodland area, high wind conditions overwhelmed all reasonably available controls. Despite best available agricultural control measures, high wind conditions associated with a very strong storm system brought high concentrations of PM_{10} emissions into, and also overwhelmed controls within, the Goodland area. The event discussed in this document that caused the exceedance in this request (see Sections 2 and 5) was caused by very high winds that transported dust into Sherman County from areas largely outside of the Goodland area. The fact that this was a natural event involving strong winds that transported PM_{10} emissions into Sherman County, with a majority of the PM_{10} emissions recorded by the Goodland monitor coming from sources outside of the Goodland area, provides strong evidence that the event and exceedance of October 6, 2011 were not reasonably controllable or preventable.

C. Natural Event

As discussed above, the event shown to cause this exceedance was emissions of PM_{10} driven by high winds caused by an intense storm system moving through the area on October 6, 2011. This event therefore qualifies as a predominantly natural event with only a very small anthropogenic contribution.

In summary, the exceedance of the federal 24-hour PM_{10} standard on October 6, 2011, would not have occurred but for the extreme high winds and windblown dust transport from areas largely outside the Goodland area, based on the following weight of evidence:

- The high PM_{10} value at the Goodland monitor in Section 2 shows that the timing of elevated PM_{10} event was consistent with decreased visibility and reports of blowing dust and/or haze at representative National Weather Service stations.

- Historical Fluctuation analyses and graphs in Section 3 showing five years of 24-hour average data for the Goodland monitor depict the atypically high PM_{10} concentration during the October 6, 2011 event. The elevated PM_{10} concentration during this day was exceptional from a historical perspective.

- The exceedance of the PM_{10} standard recorded on October 6 was tied to very strong winds, as can be seen National Weather Service warnings and meterological summaries of wind speeds from multiple cities in the area in Section 5.

- Figures in Section 5 show that the timing of the increases in wind speeds at monitoring locations and National Weather Service stations during the event is consistent with the timing of elevated PM_{10} concentrations recorded at the monitoring locations in the area.

- Wind directions, NAAPS dust modeling output, and back trajectories, all depicted in Section 5, help show that a major portion of the dust that impacted Goodland area monitor originated in areas located generally south and southwest of the Goodland area.

- Approximate increased PM_{10} emissions for this event was provided in Section 6 to give an idea of the magnitude of the dust storm that affected the Goodland area and the amount of PM_{10} that can be transported in during these types of events.

- Section 4 discusses the best available control technologies that are in place in the Goodland area in order to show that the event was not reasonably controllable or preventable. Additionally, the newspaper accounts provided in Appendix D also helps illustrate the magnitude and scale of this events which supports the claim that the exceedance recorded during this day was not reasonably controllable or preventable.

8. Public Comments

KDHE, in following the requirements listed in 40 CFR 50.14 (c)(3)(i) **Submission of demonstrations**, posted this Exceptional Events Demonstration Package on the Agency website for public comment from November 8 through December 9, 2013. In accordance with 40 CFR 50.14 (c)(3)(v), KDHE is documenting the public comments received in this section.

Kansas
Department of Health and Environment
Sam Brownback, Governor
Robert Moser, MD, Secretary

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B of A - Air Monitoring Public Notices

A to Z Topic Listing

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  - Kansas Clean Diesel Program
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Air Monitoring Public Notices

Proposed Air Monitoring Exceptional Event(s)

The Kansas Department of Health and Environment, Bureau of Air, operates an ambient air monitoring network that measures concentrations of various air pollutants. Other environmental agencies operate similar networks throughout the United States. When an event causes an exceedance of an ambient air quality standard, the event may be excluded from compliance calculations. There is a specific process for excluding an event, which includes public notice of each request. This notice provides an opportunity for public review and comment on the supporting documentation. Written comments must be received by the Bureau of Air no later than December 9, 2013, to assure consideration prior to submission of this plan. Comments from the interested public should be addressed to:

Kansas Department of Health and Environment
Bureau of Air
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366
Attention: Doug Watson

- Draft Goodland High Wind Exceptional Event Document

Proposed Revisions to the Kansas Ambient Air Monitoring Network: 2013 - 2014 Annual Monitoring Plan

The Kansas Department of Health and Environment will submit an annual ambient air quality monitoring plan to the United States Environmental Protection Agency. This notice is provided for the purpose of informing the public of this activity, and to provide an opportunity for interested parties to offer additional relevant information and comments to the Kansas Department of Health and Environment. Written comments must be received by the Bureau of Air no later than June 30, 2013, to assure consideration prior to submission of this plan. Comments from the interested public should be addressed to:

Kansas Department of Health and Environment
Bureau of Air
1000 SW Jackson, Suite 310
Topeka, KS 66612-1366
Attention: Mike Martin

- Proposed 2013 - 2014 Kansas Ambient Air Monitoring Network Plan

Previous Public Notice Documents

- 2012-2013 Kansas Ambient Air Monitoring Network Plan - Final

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

DEC 0 9 2013

Mr. Rick Brunetti, Director
Bureau of Air Quality and Radiation
Kansas Department of Health and Environment
1000 S.W. Jackson, Suite 310
Topeka, Kansas 66612-1366

Dear Mr. Brunetti:

The U.S. Environmental Protection Agency has taken this opportunity to review the Kansas Department of Health and Environment's or KDHE Draft Exceptional Event demonstration package for data that exceeded the National Ambient Air Quality Standard or NAAQS for Particulate Matter or PM_{10} at the Sherman County, Goodland, Kansas, monitoring site, on October 6, 2011. This demonstration is required pursuant to the provisions in 40 CFR Part 50.14: Treatment of Air Quality Monitoring Data Influenced by Exceptional Events or EE.

The EPA Region 7's Air Planning and Development Branch, Office of Regional Counsel, and the Analytical Services and Response Branch have reviewed KDHE's draft demonstration package for the exclusion of data. We appreciate KDHE's efforts on this package. Our only comment is that we request clarification on what steps KDHE plans to take to address the requirements of 40 CFR 51.930 Mitigation of Exceptional Events.

As always, if you have any questions or concerns, you may direct them to Gina Grier, of my staff at (913) 551-7078 or grier.gina@epa.gov.

Sincerely,

Joshua A. Tapp
Chief
Air Planning and Development Branch

Printed on Recycled Paper

8.1 KDHE response to EPA comments

EPA Comment:

1) EPA requests clarification on what steps KDHE plans to take to address the requirements of 40 CFR 51.930 Mitigation of Exceptional Events.

KDHE Response:

1) As part of the development of this exceptional event request, the KDHE and the regional National Weather Service offices worked together to develop additional language that will be added to National Weather Service (NWS) dust advisory and dust warning products issued during future dust events in the Kansas forecast areas. This language will advise listeners of the potential health effects associated with these dust events and some proactive steps that they may perform to protect themselves from these events.

   "*The Kansas Department of Health and Environment recommends that you take preventative measures during this dust (or wind) event, such as staying indoors or wearing protective breathing masks if outside. High dust concentrations can cause respiratory problems, decrease lung activity, aggravate asthma, and lead to potential heart-related problems, especially with children, elderly, or those with pre-existing respiratory conditions.*"

   KDHE is also developing additional information on its website to inform the public about the health hazards of blowing dust. This information page url will eventually be included in the statement issued by the NWS offices during dust episodes.

   In addition, the Kansas State University (KSU) Research and Extension program and the USDA-ARS Wind Erosion Research program at KSU are committed to continuing to research and promote agricultural best management practices in the State of Kansas that mitigate the potential for the loss of soil into the atmosphere caused by these high wind events.

   While the following initiatives are not meant to be enforceable, the KSU Extension Office has many efforts underway in western Kansas that further reduce blowing dust and its impacts. These include:

   - Crop residue efforts that encourage no- or low-till practices. These have been deemed appropriate and useful in reducing blowing dust.
   - Ongoing outreach efforts to educate area agricultural producers on soil management programs. These include one-on-one visitations and annual meetings with various corn and wheat programs to discuss crop management.
   - Drought workshops to protect topsoil throughout the county.

8.2 KDHE Response to Public Comments

No public comments were received by KDHE on this document.

9. References

Draxler, R.R. and Rolph, G.D., 2013. HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) Model access via NOAA ARL READY Website (http://www.arl.noaa.gov/HYSPLIT.php). NOAA Air Resources Laboratory, College Park, MD.

Kansas Department of Health and Environment, Morton and Sedgwick Counties, May 1998. State of Kansas PM10 Natural Events Action Plans (NEAP) for Morton and Sedgwick Counties

Knapp, Mary. Kansas State Climatologist; Personal communication; Kansas State University; Manhattan, KS; 2013.

Orgill, M.M., Sehmel, G.A., 1976. Frequency and diurnal variation of dust storms in the contiguous USA. **Atmospheric Environment 10**, 813–825.

U.S. Environmental Protection Agency, September 1992. Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004.

U.S. National Archives and Records Administration, July 2010. Code of Federal Regulations, Title 40, Part 58.

2007 Census of Agriculture. Vol. 1: Chapter 2: County Level Data Kansas U.S. Dept. Of Commerce: Bureau of Census.

10. APPENDIX A – Additional Language for National Weather Service Products

As part of the development of this exceptional event request, the KDHE and the regional National Weather Service offices worked together to develop additional language that will be added to National Weather Service (NWS) dust advisory and dust warning products issued during future dust events in the Kansas forecast areas. This language will advise listeners of the potential health effects associated with these dust events and some proactive steps that they may perform to protect themselves from these events.

"*The Kansas Department of Health and Environment recommends that you take preventative measures during this dust (or wind) event, such as staying indoors or wearing protective breathing masks if outside. High dust concentrations can cause respiratory problems, decrease lung activity, aggravate asthma, and lead to potential heart-related problems, especially with children, elderly, or those with pre-existing respiratory conditions.*"

11. APPENDIX B – Goodland and surrounding NWS offices advisory and warning products for October 6, 2011

GOODLAND NWS

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE GOODLAND KS
345 AM MDT THU OCT 6 2011

...STRONG WINDS EXPECTED ACROSS THE TRI-STATE REGION TODAY...

.A POTENT STORM SYSTEM WILL APPROACH THE TRI-STATE REGION TODAY.
SOUTHERLY WINDS WILL INCREASE DURING THE MORNING AND CONTINUE
THROUGH EARLY EVENING.

COZ090-KSZ001>004-014>016-028-029-042-NEZ079>081-061800-
/O.UPG.KGLD.WI.Y.0025.111006T1500Z-111007T0300Z/
/O.NEW.KGLD.HW.W.0008.111006T1600Z-111007T0300Z/
YUMA-CHEYENNE KS-RAWLINS-DECATUR-NORTON-THOMAS-SHERIDAN-GRAHAM-
LOGAN-GOVE-WICHITA-DUNDY-HITCHCOCK-RED WILLOW-
INCLUDING THE CITIES OF...YUMA...WRAY...ST. FRANCIS...ATWOOD...
OBERLIN...NORTON...COLBY...HOXIE...HILL CITY...OAKLEY...QUINTER...
LEOTI...BENKELMAN...TRENTON...MCCOOK
345 AM MDT THU OCT 6 2011 /445 AM CDT THU OCT 6 2011/

...HIGH WIND WARNING IN EFFECT FROM 10 AM MDT /11 AM CDT/ THIS
MORNING TO 9 PM MDT /10 PM CDT/ THIS EVENING...

THE NATIONAL WEATHER SERVICE IN GOODLAND HAS ISSUED A HIGH WIND
WARNING...WHICH IS IN EFFECT FROM 10 AM MDT /11 AM CDT/ THIS
MORNING TO 9 PM MDT /10 PM CDT/ THIS EVENING. THE WIND ADVISORY
IS NO LONGER IN EFFECT.

* TIMING/DURATION...SOUTH WINDS WILL INCREASE DURING THE MORNING
  AND CONTINUE THROUGH SUNSET

* PEAK WINDS...SUSTAINED WIND SPEEDS OF 40 MPH WITH GUSTS TO 60
  MPH ARE EXPECTED.

* OTHER IMPACTS...HAZARDOUS TRAVEL CONDITIONS ARE
  EXPECTED...ESPECIALLY WHERE CROSSWINDS ARE STRONG OVER OPEN
  AREAS. SOME BLOWING DUST IS ALSO POSSIBLE GIVEN THE VERY DRY
  CONDITIONS.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A HIGH WIND WARNING MEANS STRONG WINDS ARE EITHER OCCURRING OR
IMMINENT WHICH COULD LEAD TO PROPERTY DAMAGE...REDUCED VISIBILITY
IN BLOWING DUST...AND LOSS OF VEHICLE CONTROL. A HIGH WIND
WARNING IS ISSUED FOR SUSTAINED WIND SPEEDS OF AT LEAST 40 MPH OR
GUSTS OF 58 MPH OR MORE.

876
FXUS63 KGLD 061050
AFDGLD

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE GOODLAND KS
450 AM MDT THU OCT 6 2011

.DISCUSSION...
427 AM MDT THU OCT 6 2011

FORECAST CONCERNS TODAY ARE THE VERY WINDY CONDITIONS ACROSS THE CENTRAL HIGH PLAINS ALONG WITH THE DRY CONDITIONS ACROSS EASTERN COLORADO AHEAD OF THE STRONG LOW PRESSURE SYSTEM MOVING INTO THE ROCKIES LATE TODAY.

SUSTAINED SOUTH WINDS WITH SPEEDS OF NEARLY 50 MPH WILL MIX QUICKLY TO THE SURFACE AS TEMPERATURES WARM THIS MORNING. THE SURFACE TROUGH AHEAD OF THE MAIN UPPER LOW WILL PUSH EAST INTO THE FORECAST AREA TODAY. THE MORE WESTERLY WINDS ON THE BACK SIDE OF THE TROUGH WILL BE VERY DRY WITH A DOWNSLOPE COMPONENT CONTRIBUTING TO THE DRYNESS. THERE IS SOME CONCERN HOW FAR THIS DRYER AIR WILL REACH INTO THE FORECAST AREA WITH THE STRONGER WINDS...BUT FOR NOW HAVE CONFINED THAT AREA TO FAR EASTERN COLORADO WITH A RED FLAG WARNING IN EFFECT THIS AFTERNOON AND EVENING AND A HIGH WIND WARNING FROM THIS MORNING THROUGH THIS EVENING.

AHEAD OF THIS SURFACE TROUGH...MUCH MORE MOIST AIR WITH DEWPOINTS IN THE MID 50S WILL BE PULLED NORTHWARD INTO WESTERN AND CENTRAL KANSAS...WERE WARM TEMPERATURES AND AN AREA OF INSTABILITY WILL CONTRIBUTE TO THE DEVELOPMENT OF THUNDERSTORMS LATE THIS AFTERNOON AND OVERNIGHT. WITH A PORTION OF THE UPPER LOW LIFTING INTO THE NORTHERN PLAINS AND A PORTION DIGGING DEEPER INTO THE SOUTHWEST U.S.... A DEEP TROUGH IS CARVED OUT OVER THE WESTERN UNITES STATES BY SATURDAY. WITH THIS DEEPENING TROUGH AND A COLD FRONT EXPECTED TROUGH THE FORECAST AREA FRIDAY NIGHT/EARLY SATURDAY...A POSSIBILITY OF THUNDERSTORMS WILL CONTINUE OVER THE FORECAST AREA WITH THE BEST CHANCE OF PRECIPITATION ON SATURDAY. HIGH TEMPERATURES ON SATURDAY WILL ALSO BE ABOUT 15 DEGREES COOLER THAN THEY WERE ON FRIDAY.

COOLER TEMPERATURES ARE EXPECTED TO CONTINUE THROUGH THE WEEKEND WITH A GRADUAL WARMING AND DRYER CONDITIONS NEXT WEEK AS THE OVERALL PATTERN BECOMES MORE ZONAL.

LOCKHART

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177
FPUS73 KGLD 062039
NOWGLD

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE GOODLAND KS
239 PM MDT THU OCT 6 2011

COZ090>092-KSZ001>004-013>016-027>029-041-042-NEZ079>081-070000-
CHEYENNE CO-CHEYENNE KS-DECATUR-DUNDY-GOVE-GRAHAM-GREELEY-HITCHCOCK-
KIT CARSON-LOGAN-NORTON-RAWLINS-RED WILLOW-SHERIDAN-SHERMAN-THOMAS-
WALLACE-WICHITA-YUMA-
INCLUDING THE CITIES OF...BENKELMAN...BURLINGTON...COLBY...
GOODLAND...HILL CITY...LEOTI...MCCOOK...NORTON...OBERLIN...YUMA
239 PM MDT (339 PM CDT) THU OCT 6 2011

.NOW...

AREAS OF BLOWING DUST HAVE DEVELOPED AND WILL CONTINUE INTO EARLY
THIS EVENING. VERY LOW VISIBILITIES HAVE ALREADY BEEN REPORTED ALONG
INTERSTATE 70. IN FACT...THE INTERSTATE FROM BURLINGTON TO COLBY HAS
BEEN CLOSED DUE TO POOR VISIBILITY. MOTORISTS NEED TO DRIVE WITH
CAUTION...AND BE PREPARED FOR RAPIDLY CHANGING VISIBILITIES...
ESPECIALLY NEAR NEWLY PLOWED FIELDS. VISIBILITIES NEAR ZERO WILL
OCCUR AND HAVE ALREADY OCCURRED.

$$

BULLER

767
FPUS73 KGLD 062325
NOWGLD

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE GOODLAND KS
525 PM MDT THU OCT 6 2011

COZ090>092-KSZ001>004-013>016-027>029-041-042-NEZ079>081-070300-
YUMA-KIT CARSON-CHEYENNE CO-CHEYENNE KS-RAWLINS-DECATUR-NORTON-
SHERMAN-THOMAS-SHERIDAN-GRAHAM-WALLACE-LOGAN-GOVE-GREELEY-WICHITA-
DUNDY-HITCHCOCK-RED WILLOW-
INCLUDING THE CITIES OF...YUMA...WRAY...BURLINGTON...
CHEYENNE WELLS...ST. FRANCIS...ATWOOD...OBERLIN...NORTON...
GOODLAND...COLBY...HOXIE...HILL CITY...SHARON SPRINGS...OAKLEY...
QUINTER...TRIBUNE...LEOTI...BENKELMAN...TRENTON...MCCOOK
525 PM MDT THU OCT 6 2011 /625 PM CDT THU OCT 6 2011/

.NOW...

SOUTH WINDS AT 30 TO 40 MPH WITH GUSTS UP TO 55 MPH CONTINUE
ACROSS THE TRI-STATE AREA EARLY THIS EVENING. AREAS OF BLOWING
DUST NEAR OPEN FIELDS WILL CONTINUE TO REDUCE VISIBILITIES ACROSS
THE AREA. MOTORISTS SHOULD DRIVE WITH CAUTION AND BE PREPARED FOR
VISIBILITIES NEAR ZERO.

$$
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Quality Control
Variables

DODGE CITY NWS

429
WWUS73 KDDC 060904
NPWDDC

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE DODGE CITY KS
404 AM CDT THU OCT 6 2011

...STRONG SOUTHERLY WINDS EXPECTED LATE THIS MORNING THROUGH EARLY THIS EVENING...

.A STRONG LEE SIDE TROUGH OF LOW PRESSURE WILL CONTINUE ACROSS EXTREME EASTERN COLORADO TODAY. THIS WILL KEEP A TIGHT SURFACE PRESSURE GRADIENT IN PLACE AND VERY STRONG GUSTY WINDS WILL DEVELOP. DAYTIME HEATING WILL HELP MIX DOWN EVEN STRONGER WINDS ALOFT...ESPECIALLY ALONG THE COLORADO BORDER.

KSZ030-043>045-062-063-075-076-085-086-061715-
/O.UPG.KDDC.WI.Y.0032.111006T1800Z-111007T0300Z/
/O.NEW.KDDC.HW.W.0008.111006T1600Z-111007T0300Z/
TREGO-SCOTT-LANE-NESS-KEARNY-FINNEY-GRANT-HASKELL-STEVENS-SEWARD-
INCLUDING THE CITIES OF...WAKEENEY...CEDAR BLUFF RESERVOIR...
SCOTT CITY...DIGHTON...NESS CITY...LAKIN...DEERFIELD...
GARDEN CITY...KALVESTA...ULYSSES...SUBLETTE...SATANTA...HUGOTON...
MOSCOW...LIBERAL...KISMET
404 AM CDT THU OCT 6 2011

...HIGH WIND WARNING IN EFFECT FROM 11 AM THIS MORNING TO 10 PM CDT THIS EVENING...

THE NATIONAL WEATHER SERVICE IN DODGE CITY HAS ISSUED A HIGH WIND WARNING...WHICH IS IN EFFECT FROM 11 AM THIS MORNING TO 10 PM CDT THIS EVENING. THE WIND ADVISORY IS NO LONGER IN EFFECT.

* TIMING...STRONG WINDS ARE EXPECTED TO DEVELOP LATE THIS MORNING THROUGH THE EARLY EVENING.

* WINDS...SOUTH WINDS ARE EXPECTED TO INCREASE TO 35 TO 45 MPH WITH SOME GUSTS ABOVE 50 MPH POSSIBLE.

* IMPACTS...HAZARDOUS TRAVEL CONDITIONS CAN BE EXPECTED FOR DRIVERS...PARTICULARLY ON EAST-WEST ROADS AND HIGHWAYS. BLOWING DUST MAY BECOME A PROBLEM IN SOME AREAS AND REDUCE VISIBILITY.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A HIGH WIND WARNING MEANS A HAZARDOUS HIGH WIND EVENT IS EXPECTED OR OCCURRING.

```
403
WWUS73 KDDC 061650
NPWDDC

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE DODGE CITY KS
1150 AM CDT THU OCT 6 2011

...STRONG SOUTHERLY WINDS EXPECTED THROUGH EARLY THIS EVENING...

.A STRONG LEE SIDE TROUGH OF LOW PRESSURE WILL CONTINUE ACROSS
EXTREME EASTERN COLORADO TODAY. THIS WILL KEEP A TIGHT SURFACE
PRESSURE GRADIENT IN PLACE INFLUENCING VERY STRONG GUSTY WINDS.
DAYTIME HEATING WILL HELP MIX DOWN EVEN STRONGER WINDS
ALOFT...ESPECIALLY ALONG THE COLORADO BORDER.

KSZ030-043>045-061>063-074>076-084>086-070100-
/O.CON.KDDC.HW.W.0008.000000T0000Z-111007T0300Z/
TREGO-SCOTT-LANE-NESS-HAMILTON-KEARNY-FINNEY-STANTON-GRANT-
HASKELL-MORTON-STEVENS-SEWARD-
INCLUDING THE CITIES OF...WAKEENEY...CEDAR BLUFF RESERVOIR...
SCOTT CITY...DIGHTON...NESS CITY...SYRACUSE...LAKIN...DEERFIELD...
GARDEN CITY...KALVESTA...JOHNSON CITY...ULYSSES...SUBLETTE...
SATANTA...ELKHART...RICHFIELD...HUGOTON...MOSCOW...LIBERAL...
KISMET
1150 AM CDT THU OCT 6 2011 /1050 AM MDT THU OCT 6 2011/

...HIGH WIND WARNING REMAINS IN EFFECT UNTIL 10 PM CDT /9 PM MDT/
THIS EVENING...

A HIGH WIND WARNING REMAINS IN EFFECT UNTIL 10 PM CDT /9 PM MDT/
THIS EVENING.

* TIMING...STRONG WINDS ARE EXPECTED TO CONTINUE THROUGH EARLY
  THIS EVENING.

* WINDS...SOUTH WINDS OF 35 TO 45 MPH ARE EXPECTED WITH SOME
  POSSIBLE GUSTS ABOVE 50 MPH.

* IMPACTS...HAZARDOUS TRAVEL CONDITIONS CAN BE EXPECTED FOR
  DRIVERS...PARTICULARLY ON EAST-WEST ROADS AND HIGHWAYS.
  BLOWING DUST MAY BECOME A PROBLEM IN SOME AREAS AND REDUCE
  VISIBILITY.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A HIGH WIND WARNING MEANS A HAZARDOUS HIGH WIND EVENT IS EXPECTED
OR OCCURRING.
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AMARILLO, TX NWS

HAZARDOUS WEATHER OUTLOOK
NATIONAL WEATHER SERVICE AMARILLO TX
405 AM CDT THU OCT 6 2011

OKZ001>003-TXZ001>020-062115-
CIMARRON-TEXAS-BEAVER-DALLAM-SHERMAN-HANSFORD-OCHILTREE-LIPSCOMB-
HARTLEY-MOORE-HUTCHINSON-ROBERTS-HEMPHILL-OLDHAM-POTTER-CARSON-
GRAY-WHEELER-DEAF SMITH-RANDALL-ARMSTRONG-DONLEY-COLLINGSWORTH-
405 AM CDT THU OCT 6 2011

THIS HAZARDOUS WEATHER OUTLOOK IS FOR THE TEXAS AND OKLAHOMA
PANHANDLES.

.DAY ONE...TODAY AND TONIGHT.

THUNDERSTORMS ARE POSSIBLE ACROSS THE PANHANDLES THROUGH TONIGHT. A
COUPLE OF STORMS MAY BECOME SEVERE WITH LARGE HAIL AND DAMAGING WINDS
THE MAIN HAZARDS.

A WIND ADVISORY IS IN EFFECT UNTIL 8 PM FOR THE OKLAHOMA PANHANDLE
AND THE NORTHERN AND WESTERN TEXAS PANHANDLE WHERE SOUTH WINDS
AROUND 35 MPH WITH GUSTS TO AROUND 50 MPH ARE EXPECTED.

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE AMARILLO TX
543 PM CDT THU OCT 6 2011

OKZ001-TXZ001-006-070100-
/O.UPG.KAMA.WI.Y.0015.000000T0000Z-111007T0100Z/
/O.NEW.KAMA.HW.W.0008.111006T2243Z-111007T0100Z/
CIMARRON-DALLAM-HARTLEY-
INCLUDING THE CITIES OF...BOISE CITY...KEYES...DALHART...
HARTLEY...CHANNING
543 PM CDT THU OCT 6 2011

...HIGH WIND WARNING IN EFFECT UNTIL 8 PM CDT THIS EVENING...

THE NATIONAL WEATHER SERVICE IN AMARILLO HAS ISSUED A HIGH WIND WARNING...WHICH IS IN EFFECT UNTIL 8 PM CDT THIS EVENING. THE WIND ADVISORY IS NO LONGER IN EFFECT.

* EVENT...SOUTH WINDS OF 35 TO 45 MPH WITH GUSTS TO AROUND 60 MPH WILL CONTINUE THIS AFTERNOON AND EARLY THIS EVENING ACROSS THE WESTERN OKLAHOMA PANHANDLE AND THE NORTHWESTERN TEXAS PANHANDLE.

* TIMING...THE STRONGEST WINDS WILL CONTINUE THROUGH SUNSET THIS EVENING.

* IMPACTS...THE STRONG WINDS MAY CAUSE BLOWING DUST WHICH WILL LIKELY REDUCE THE VISIBILITY. OUTDOOR FURNITURE AND TRASH CANS MAY BE BLOWN ABOUT BY THE WIND.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A HIGH WIND WARNING MEANS A HAZARDOUS HIGH WIND EVENT IS EXPECTED OR OCCURRING. SUSTAINED WIND SPEEDS OF AT LEAST 40 MPH OR GUSTS OF 58 MPH OR MORE CAN LEAD TO PROPERTY DAMAGE.

NORMAN, OK NWS

798
WWUS74 KOUN 061511
NPWOUN

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE NORMAN OK
1011 AM CDT THU OCT 6 2011

OKZ004>006-009>011-014>016-070000-
/O.EXT.KOUN.WI.Y.0018.111006T1511Z-111007T0200Z/
HARPER-WOODS-ALFALFA-ELLIS-WOODWARD-MAJOR-ROGER MILLS-DEWEY-
CUSTER-
INCLUDING THE CITIES OF...BUFFALO...ALVA...CHEROKEE...ARNETT...
WOODWARD...FAIRVIEW...CHEYENNE...TALOGA...WEATHERFORD...CLINTON
1011 AM CDT THU OCT 6 2011

...WIND ADVISORY NOW IN EFFECT UNTIL 9 PM CDT THIS EVENING...

A WIND ADVISORY IS IN EFFECT FOR MUCH OF NORTHWESTERN OKLAHOMA THROUGH THIS EVENING.

* TIMING: UNTIL 9 PM.

* WINDS: SOUTH 25 TO 35 MPH... WITH GUSTS OVER 40 MPH.

* IMPACTS: DIFFICULTY DRIVING...ESPECIALLY IN HIGH PROFILE VEHICLES ON EAST-WEST ROADS. UNSECURED ITEMS MAY BE DISPLACED.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

BE CAREFUL IF YOU HAVE TO TRAVEL OR IF YOU ARE WORKING OR PLAYING OUTSIDE.

201
FPUS74 KOUN 062011
NOWOUN

SHORT TERM FORECAST
NATIONAL WEATHER SERVICE NORMAN OK
310 PM CDT THU OCT 6 2011

OKZ004>048-050>052-TXZ083>090-062200-
ALFALFA-ARCHER-ATOKA-BAYLOR-BECKHAM-BLAINE-BRYAN-CADDO-CANADIAN-
CARTER-CLAY-CLEVELAND-COAL-COMANCHE-COTTON-CUSTER-DEWEY-ELLIS-FOARD-
GARFIELD-GARVIN-GRADY-GRANT-GREER-HARDEMAN-HARMON-HARPER-HUGHES-
JACKSON-JEFFERSON-JOHNSTON-KAY-KINGFISHER-KIOWA-KNOX-LINCOLN-LOGAN-
LOVE-MAJOR-MARSHALL-MCCLAIN-MURRAY-NOBLE-OKLAHOMA-PAYNE-PONTOTOC-
POTTAWATOMIE-ROGER MILLS-SEMINOLE-STEPHENS-TILLMAN-WASHITA-WICHITA-
WILBARGER-
310 PM CDT THU OCT 6 2011

.REGIONAL WEATHER DISCUSSION...

STRONG SOUTHEASTERLY WINDS WILL CONTINUE THROUGH THIS AFTERNOON... ESPECIALLY IN WESTERN OKLAHOMA.

WIND SPEEDS ACROSS MUCH OF NORTHWEST OKLAHOMA WILL RANGE FROM 25 TO 35 MPH... WITH FREQUENT GUSTS BETWEEN 40 AND 45 MPH. FARTHER SOUTH AND EAST... SPEEDS WILL BE IN THE 15 TO 25 MPH RANGE... WITH GUSTS TO 35 MPH.

URGENT - WEATHER MESSAGE
NATIONAL WEATHER SERVICE PUEBLO CO
406 AM MDT THU OCT 6 2011

COZ089-093>099-061615-
/O.UPG.KPUB.HW.A.0004.111006T1800Z-111007T0300Z/
/O.NEW.KPUB.HW.W.0008.111006T1800Z-111007T0300Z/
CROWLEY COUNTY-LA JUNTA VICINITY/OTERO COUNTY-
EASTERN LAS ANIMAS COUNTY-WESTERN KIOWA COUNTY-
EASTERN KIOWA COUNTY-LAS ANIMAS VICINITY/BENT COUNTY-
LAMAR VICINITY/PROWERS COUNTY-SPRINGFIELD VICINITY/BACA COUNTY-
INCLUDING...ORDWAY...OLNEY SPRINGS...LA JUNTA...ROCKY FORD...
BRANSON...KIM...EADS...SHERIDAN LAKE...LAS ANIMAS...LAMAR...
SPRINGFIELD...WALSH
406 AM MDT THU OCT 6 2011

...HIGH WIND WARNING IN EFFECT FROM NOON TODAY TO 9 PM MDT THIS EVENING...

THE NATIONAL WEATHER SERVICE IN PUEBLO HAS ISSUED A HIGH WIND WARNING...WHICH IS IN EFFECT FROM NOON TODAY TO 9 PM MDT THIS EVENING. THE HIGH WIND WATCH IS NO LONGER IN EFFECT.

* LOCATION...THE SOUTHEAST PLAINS INCLUDING CROWLEY...OTERO... BENT...PROWERS...KIOWA...BACA AND EASTERN LAS ANIMAS COUNTIES.

* CAUSE AND TIMING...A STRONG UPPER LEVEL JET STREAM WILL MOVE ACROSS THE AREA TODAY SPREADING STRONG WINDS ACROSS THE SOUTHEAST PLAINS THIS AFTERNOON THROUGH THIS EVENING.

* WIND...SOUTH TO SOUTHWEST WINDS INCREASING TO 35 TO 45 MPH WITH GUSTS TO 60 MPH BY THIS AFTERNOON.

* IMPACT...WINDS OF THIS FORCE CAN CAUSE PROPERTY DAMAGE... ESPECIALLY TO MOBILE HOMES. DRIVERS OF HIGH PROFILE VEHICLES ARE VULNERABLE TO THE THREAT OF STRONG CROSSWINDS...ESPECIALLY ON EAST TO WEST ORIENTED ROADWAYS SUCH AS HIGHWAY 50. OTHER POTENTIAL HIGH WIND HAZARDS INCLUDE FLYING DEBRIS AND BLOWING DUST.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

HIGH WINDS CAPABLE OF CAUSING POWER OUTAGES AND PROPERTY DAMAGE ARE EXPECTED.

THESE WINDS CAN CAUSE LIGHTWEIGHT OBJECTS TO BECOME DANGEROUS AIRBORNE PROJECTILES. HIGH PROFILE VEHICLES AND VEHICLES PULLING TRAILERS CAN BE FLIPPED BY CROSSWINDS. BLOWING DUST CAN QUICKLY REDUCE VISIBILITY TO NEAR ZERO...RESULTING IN HAZARDOUS DRIVING CONDITIONS AND ACCIDENTS INVOLVING MOTORISTS TAKEN BY SURPRISE. BLOWING DUST OR SAND CAN ALSO BE A HEALTH HAZARD FOR THOSE WITH RESPIRATORY PROBLEMS. SECURE LIGHTWEIGHT OBJECTS. AVOID TRAVELING ON ROADS WITH CROSSWINDS.

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PRELIMINARY LOCAL STORM REPORT...SUMMARY
NATIONAL WEATHER SERVICE PUEBLO CO
343 PM MDT THU OCT 06 2011

..TIME...   ...EVENT...      ...CITY LOCATION...     ...LAT.LON...
..DATE...   ....MAG....      ..COUNTY LOCATION..ST.. ...SOURCE....
            ..REMARKS..

0320 PM     NON-TSTM WND GST 7 SSE SPRINGFIELD       37.31N 102.59W
10/06/2011  M63.00 MPH       BACA                CO   ASOS

0301 PM     NON-TSTM WND GST 17 NW TWO BUTTES        37.75N 102.60W
10/06/2011  M60.00 MPH       PROWERS             CO   OTHER FEDERAL

            GOBBLERS KNOB CDOT.

0237 PM     NON-TSTM WND GST 5 ENE PEYTON            39.05N 104.39W
10/06/2011  M73.00 MPH       EL PASO             CO   PUBLIC

0237 PM     NON-TSTM WND GST 4 SW CAMPO              37.06N 102.63W
10/06/2011  M66.00 MPH       BACA                CO   OTHER FEDERAL

            UTE CANYON BLM/USDA.

0207 PM     NON-TSTM WND GST 5 ENE PEYTON            39.05N 104.39W
10/06/2011  M70.00 MPH       EL PASO             CO   PUBLIC

0159 PM     NON-TSTM WND GST 4 SW CAMPO              37.06N 102.63W
10/06/2011  M66.00 MPH       BACA                CO   OTHER FEDERAL

            UTE CANYON BLM/USDA.

0150 PM     NON-TSTM WND DMG 2 SSW PUEBLO            38.24N 104.63W
10/06/2011                   PUEBLO              CO   TRAINED SPOTTER

            3 INCH DIAMETER LIMBS BLOWN OFF OF TREES

0143 PM     NON-TSTM WND GST 3 ESE HOEHNE            37.26N 104.34W
10/06/2011  M59.00 MPH       LAS ANIMAS          CO   ASOS

            TRINIDAD AIRPORT ASOS.

0137 PM     NON-TSTM WND GST 5 ENE PEYTON            39.05N 104.39W
10/06/2011  M65.00 MPH       EL PASO             CO   PUBLIC

0135 PM     NON-TSTM WND GST 2 NE AGUILAR            37.42N 104.63W
10/06/2011  M67.00 MPH       LAS ANIMAS          CO   MESONET

            I-25 AT AGUILAR CDOT.

0117 PM     NON-TSTM WND GST 3 NNW COLORADO CITY     37.98N 104.87W
10/06/2011  M62.00 MPH       PUEBLO              CO   CO-OP OBSERVER

1223 PM     NON-TSTM WND GST 28 ESE COLORADO SPRINGS 38.68N 104.34W
10/06/2011  M59.00 MPH       EL PASO             CO   ASOS
```
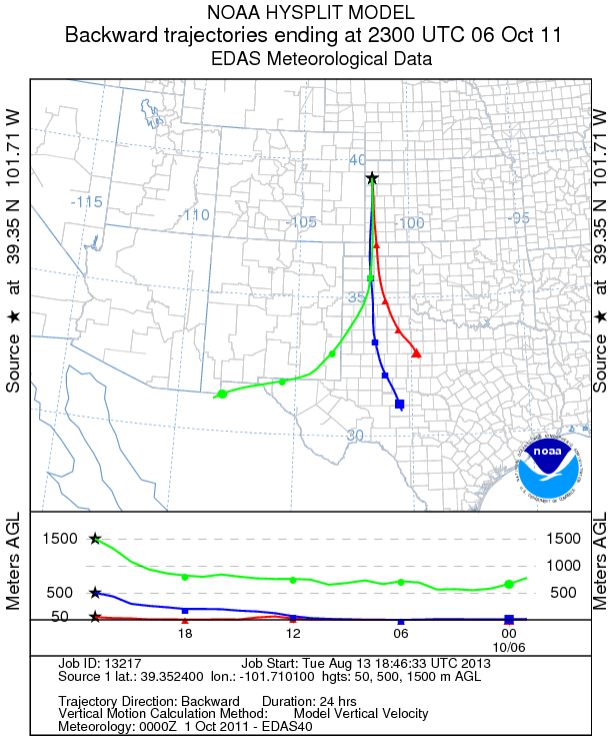
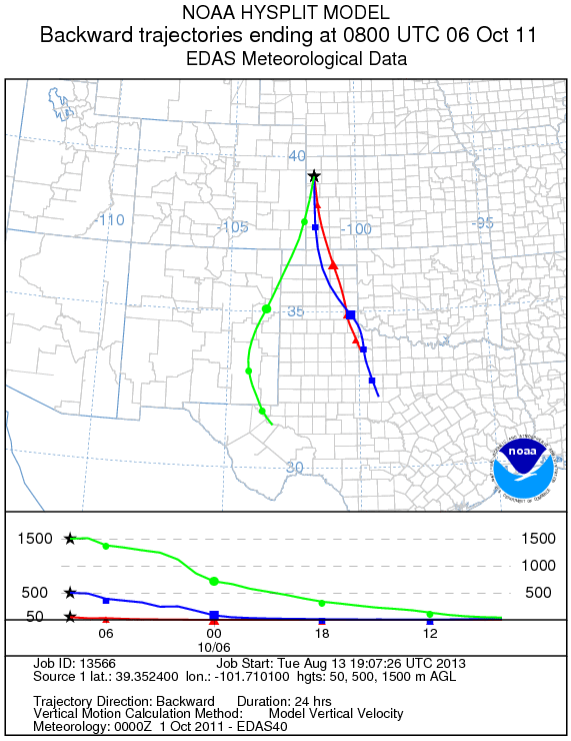
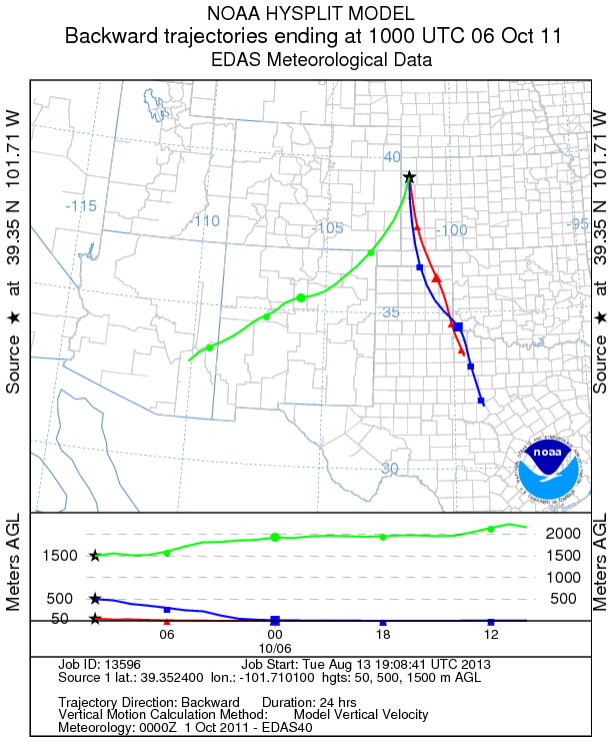
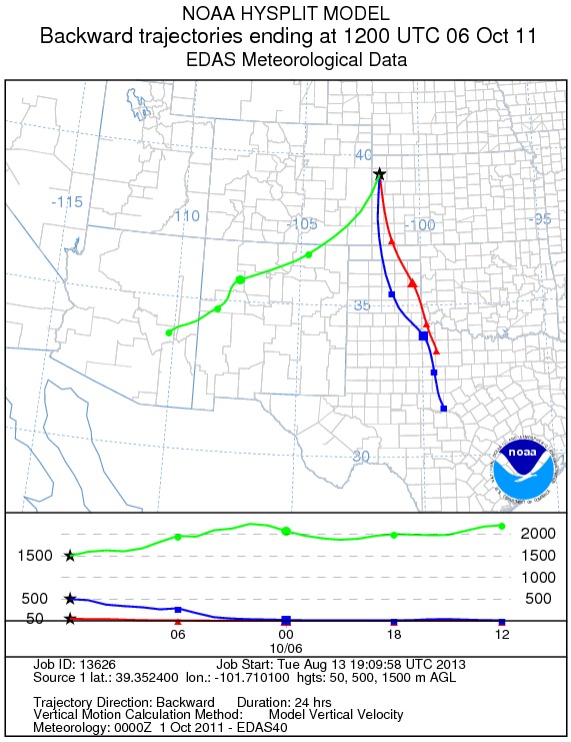
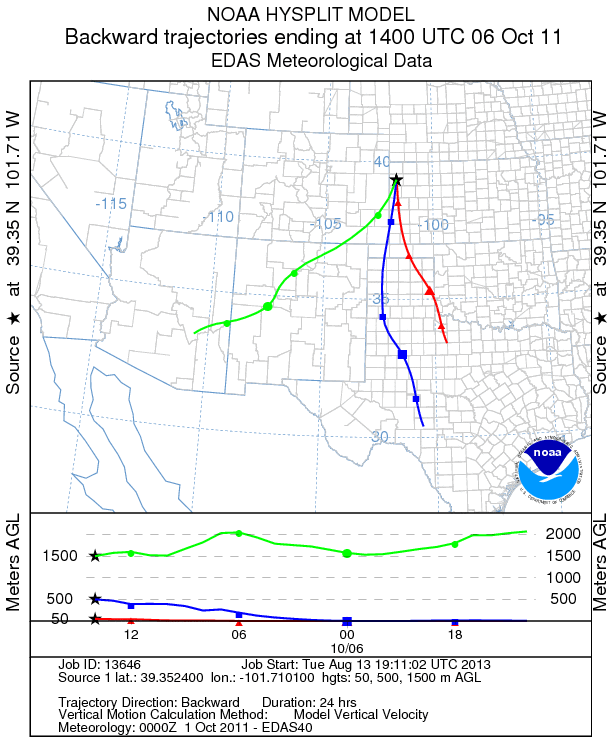

12. Appendix C - Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) Runs for Goodland,KS on October 6, 2011

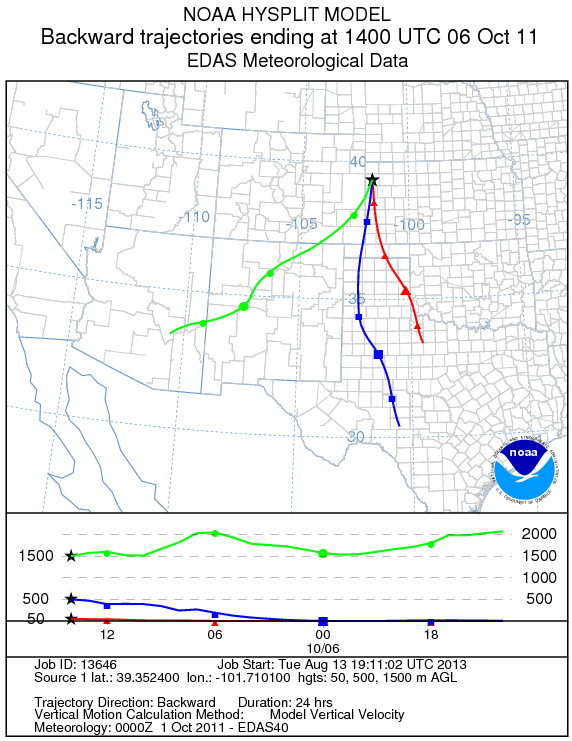









NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
2000
1500
1000
500
50
12
06
00
18
10/06
Job ID: 13646 Job Start: Tue Aug 13 19:11:02 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 1400 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
2000
1500
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12
06
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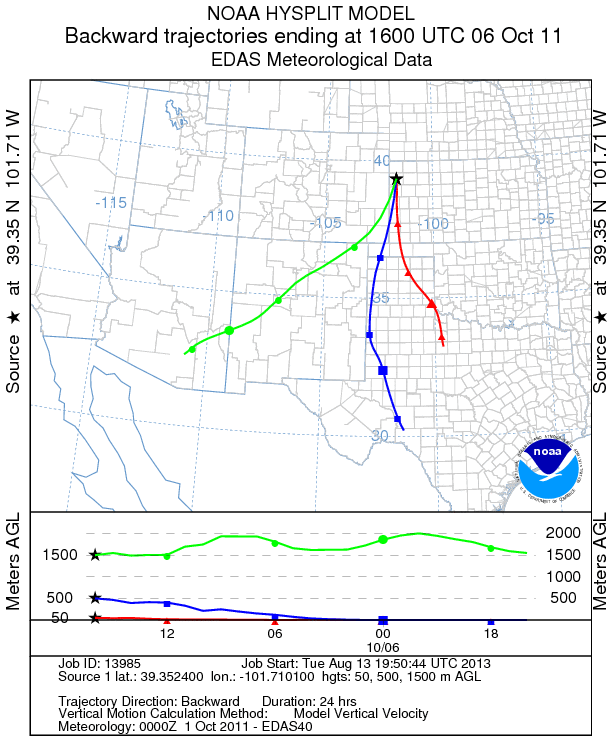
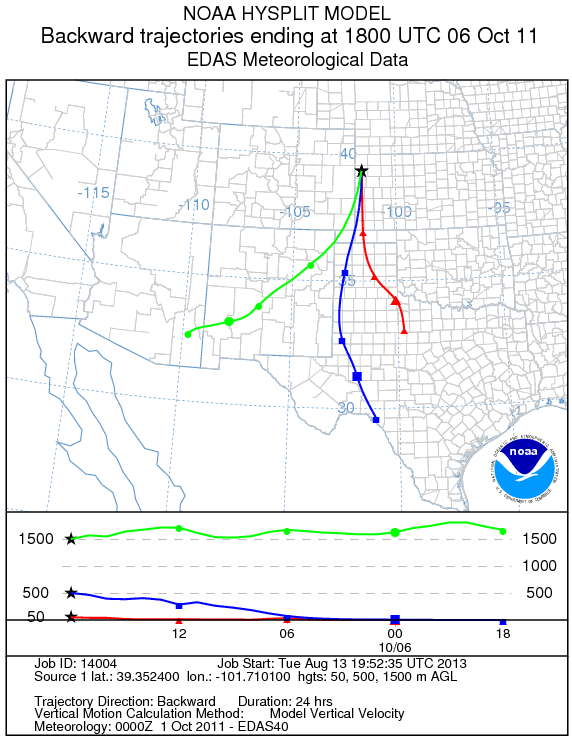
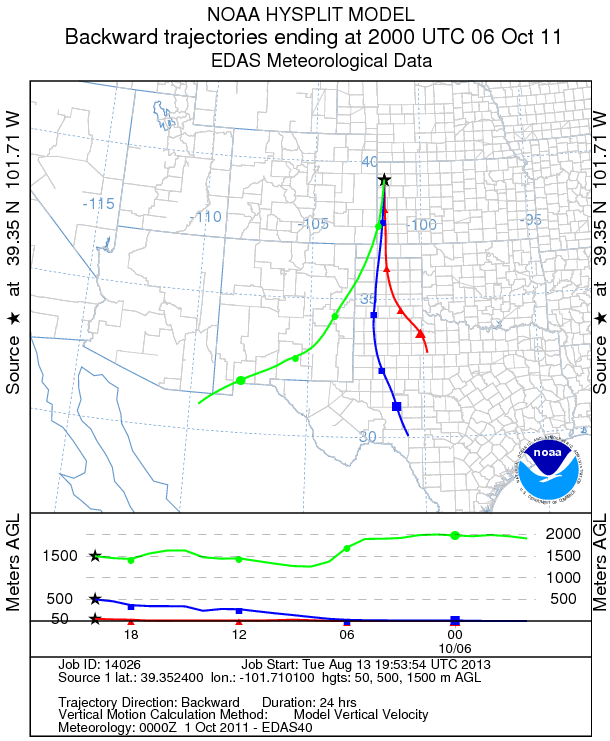
Job ID: 13646 Job Start: Tue Aug 13 19:11:02 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 1600 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
2000
1500
1000
500
50
12
06
00
18
10/06
Job ID: 13985 Job Start: Tue Aug 13 19:50:44 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 1800 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
1500
1000
500
50
12
06
00
18
10/06
Job ID: 14004 Job Start: Tue Aug 13 19:52:35 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40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Backward trajectories ending at 2000 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
Job ID: 14026 Job Start: Tue Aug 13 19:53:54 UTC 2013
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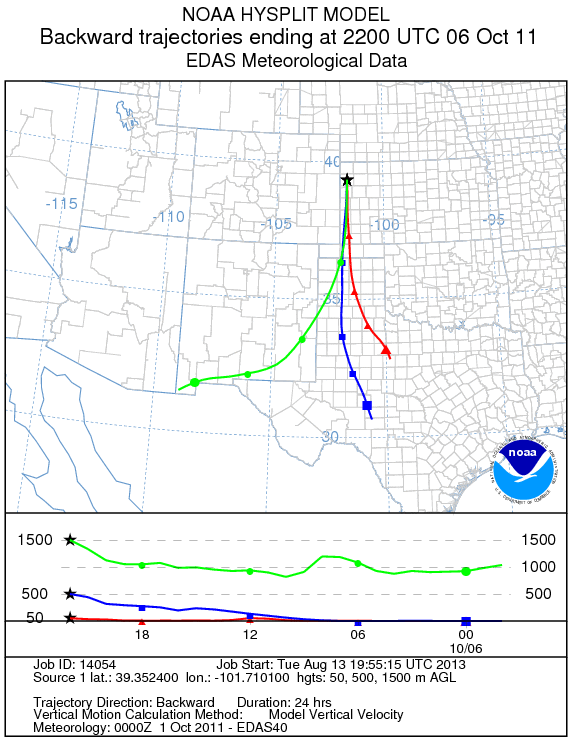
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 2200 UTC 06 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
Job ID: 14054 Job Start: Tue Aug 13 19:55:15 UTC 2013
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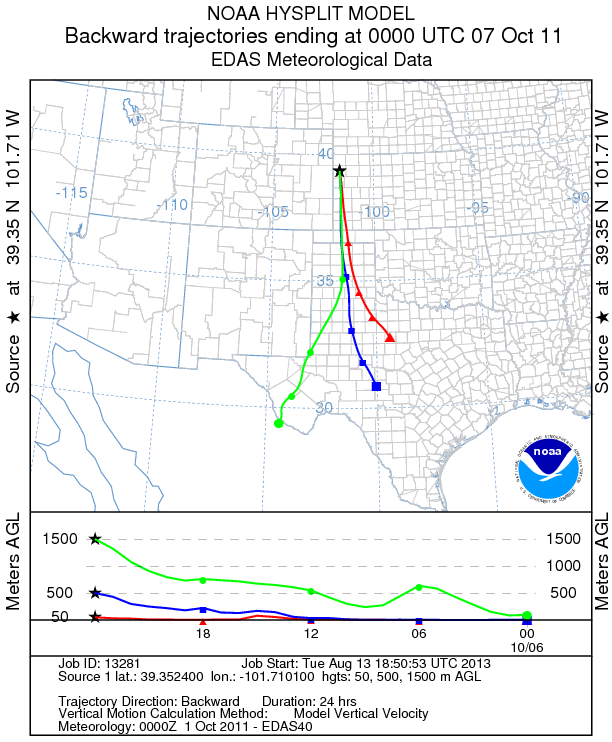
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 0000 UTC 07 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
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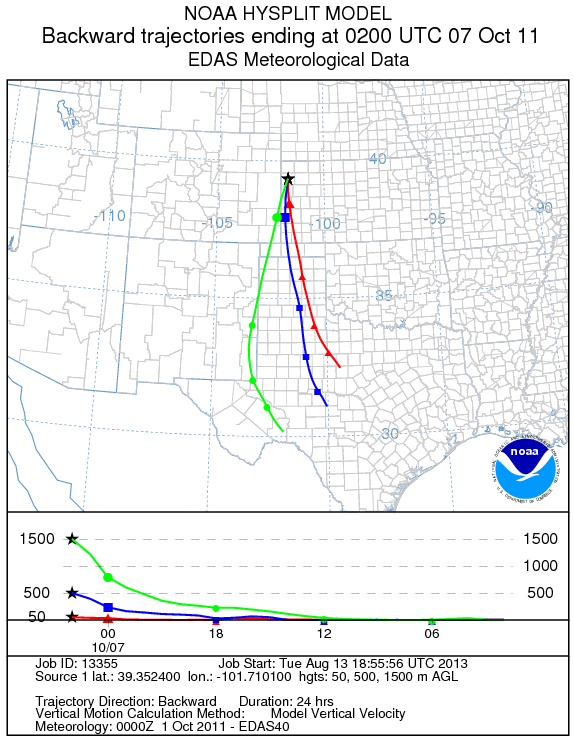
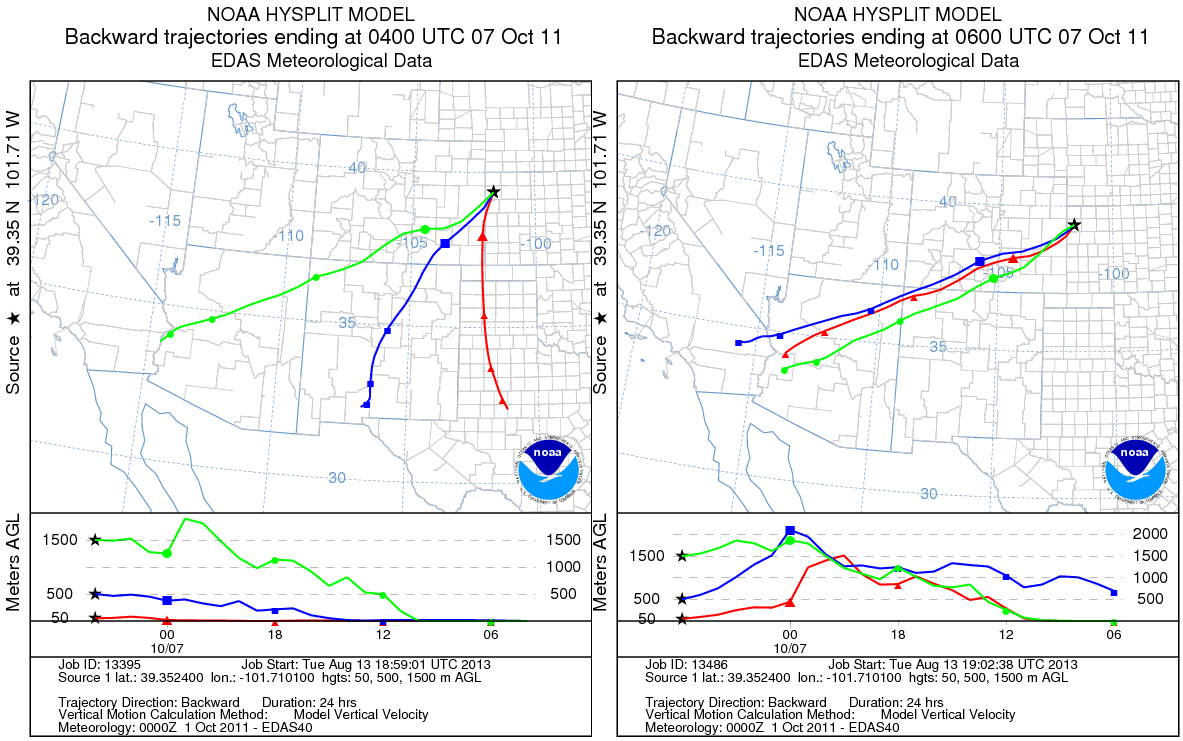
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 0200 UTC 07 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
Job ID: 13355 Job Start: Tue Aug 13 18:55:56 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40


NOAA HYSPLIT MODEL
Backward trajectories ending at 0400 UTC 07 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
1500
500
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00
10/07
18
12
06
Job ID: 13395 Job Start: Tue Aug 13 18:59:01 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40
NOAA HYSPLIT MODEL
Backward trajectories ending at 0600 UTC 07 Oct 11
EDAS Meteorological Data
Source ★ at 39.35 N 101.71 W
Meters AGL
2000
1500
1000
500
50
00
10/07
18
12
06
Job ID: 13486 Job Start: Tue Aug 13 19:02:38 UTC 2013
Source 1 lat.: 39.352400 lon.: -101.710100 hgts: 50, 500, 1500 m AGL
Trajectory Direction: Backward Duration: 24 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Meteorology: 0000Z 1 Oct 2011 - EDAS40

13. Appendix D – Newspaper Accounts of October 6, 2011 Dust Storm

631

~~Wind~~ last Thursday shuts down the Eastern Plains

Everyone knew the wind was blowing, windows and doors were rattling, shingles had gone flying.

However, by last Thursday afternoon, Oct. 6, the wind had raised so much dust that driving conditions had become hazardous and the Colorado State Patrol closed down Interstate 70 from Burlington to the Kansas state line, both east- and westbound.

According to Kit Carson County Sheriff's office, Interstate 70 was closed at 1:28 p.m. and Hwy 24 was closed at 2:07 p.m.

The roads were reopened at 4:50 p.m. with slightly calmer winds, but some dust was still visible in the air.

Available space in parking lots and along Rose Avenue east of the underpass were lined with vehicles of every description waiting for the go ahead.

Reports from the National Weather Service at Goodland, Kan. show the highest wind recorded at Burlington/Kit Carson County Airport was 66 miles per hour.

The Goodland airport reached a high of 60 mph and a sensor 4 miles west of there recorded 60 mph.

The high winds on Thursday, Oct. 6, seemed to flow along the Interstate and southerly.

Perry Brewer retrieved information from the various CSU weather stations that day as follows:

Burlington No. 1, 10 miles east and 12 miles north, maximum wind speed was 14.7 with gusts to 35 mph.

Burlington No. 2, 7 miles east and 4 south, average wind speed 20.4 with maximum gust of 46.7 mph.

Burlington No. 3, 4 miles northeast of Burlington, average wind speed of 14 mph and maximum gust of 32.5 mph.

At the Burlington/Kit Carson County Airport average wind speed was 14 mph with maximum gust of 62 mph.

Kirk and Idalia stations reported 15.4 and 15.8 average and gusts of 37.5 and 41.4 respectively.

The Burlington Record
Burlington,CO
Circ. 3292
From Page: 1
10/13/2011
143105

Strong winds caused major problems for Eastern Colorado residents Thursday, Oct. 6, with road closures due to low visability from the blowing dirt. (Photos by John Van Nostrand, Liz Chrzan and Greg Penny.)

County: Kit Carson
143105-10-13_1001.pdf

Strong winds caused major problems for Eastern Colorado residents Thursday, Oct. 6, with road closures due to low visability from the blowing dirt. (Photos by John Van Nostrand, Liz Chrzan and Greg Penny.)

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Mail-in ballots sent to voters this week for Nov. 1 election

School board elections and questions on several school districts' financing are on the ballot

According to Kit Carson County Clerk Della Calhoon, ballots were mailed out to residents of Kit Carson County on Tuesday this week. Ballots must be returned, either by mail or to the courthouse, no later than Tuesday, Nov. 1.

Voters are reminded that the Nov. 1 election is a mail-in ballot election, no polls will be open to vote.

Sample ballots with candidates and propositions for all school districts are on page 7D in this week's Burlington Record.

Burlington School District mill levy override

Burlington School District RE-6J is requesting an additional $600,000 a year through a property tax increase, known as a mill levy override. If approved, the additional funds will be used for staff pay and various facility improvements. Half of the $600,000 amount will expire in five years. The remaining amount will stay indefinitely.

"Over the past three years the district has cut $650,000 from its budget. These cuts were required as the state reduced our revenue," Superintendent Don Anderson explained. "To help maintain our facilities, we need additional funds."

Burlington's beginning pay rate for teachers is $26,805 which is about $3,300 less than most Eastern Colorado districts. The state average is $31,753.

If the mill levy passes, the base pay for Burlington teachers will increase to $30,000.

Other employees from secretaries, custodians, cooks and bus drivers will also receive pay raises.

Statewide funding question on ballot

Voters will also be asked to temporarily increase state sales with state proposition on the ballot.

Proposition 103 increases the state income and sales and use tax rates and requires the state to spend the money on public education. Public education includes public preschools, kindergarten through 12th grade schools, colleges and universities.

The state's current income tax rate is 4.63 percent for both households and businesses, regardless of income level.

In 1987, the state moved from a graduated income tax rate to a single tax rate, which was initially set at 5.0 percent. This rate was reduced to 4.75 percent in 1999, and reduced again to 4.63 percent in 2000. Proposition 103 returns the rate to 5 percent for five years, after which it will be restored to 4.63 percent.

In 2000, the state legislature reduced the sales and use tax rate from 3.0 to 2.9 percent. Proposition 103 returns the rate to 3.0 percent for five years, after which it will be restored to 2.9 percent. The measure does not affect local tax rates.

Over the five-year period of the tax rate increase, the state will collect about $2.9 billion in new tax revenue for public education.

Bethune, Stratton and Idalia school districts have ballot questions

Bethune School District R-5 will be asking voters to increase consecutive term limits for board members from two to three terms.

Stratton School District R-4 is requesting a mill levy override that will produce increased revenues of $76,120.

Funds will be used for maintenance of current programs in lieu of recent substantial cuts in funding from the state. The Stratton School District will also consider the reinstating of the music program back in the school.

Idalia School Distrst RJ-3 has a bond issue on the ballot for voter approval of $3,870,029 for matching money for "BEST" grant. If the bond proposal is passed, the funds generated, along with the "BEST" grant money will be used to renovate, construct and improve the pre-kindergarten through 12th grade classroom facilities on the existing campus through a new facility to replace non-conforming classroom buildings and renovation of the existing gymnasium building. This will bring the whole school up to code on fire safety, security and emergency, and also upgrade technology.

Area school board candidates

Area school districts have several candidates on the ballot.

Bethune, vote for two: Charles Schulte.

Hi-Plains, vote for three: Bob Johnson, Larry Tagtmeyer, Justin Rueb, Larry Matschke, Cindy L. McCaffrey

Idalia, vote for three: Susan Knodel, Nancy Helling, Lindsey Richards, Larry Weyerman.

Liberty, vote for 3, Joseph Hase, Christine Herrick, Michael Holtman, Danny Felty, Sonya Shaw and Daniel Underwood.

THE BURLINGTON RECORD

A Community Newspaper Recording and Interpreting the Activities, Interests and News of Kit Carson County

The Burlington Record, Burlington, Colorado, Thursday, October 13, 2011

123rd Year ISSN-USPS 079-980 Number 28


Pauline Durham


Diane Mettling


Lynette Penny


Carrie Gordon


Sean Brenner


Tracie Mesecher


TJ Powell

Public meeting tonight on Burlington school mill levy override

Voters are invited to a public comment meeting at 7 p.m., Thursday, Oct. 13 at the high school auditorium concerning the school district's mill levy override question on the Nov. 1 ballot.

School board candidates answer questions for voters

Seven candidates are running for four positions on the Burlington School District RE-6J school board election Nov. 1. Candidates are T.J. Powell, Tracie Mesecher, Sean Brenner, Diane Mettling, Lynette Penny, Carrie Gordon and Pauline Durham. The four candidates with the most votes will be selected to serve four-year terms.

Powell and Mesecher are the incumbents as they both filled vacant positions since the 2009 election. Terms held by Dennis Coryell and board president Gary Penny expire, they are term limited.

The Burlington Record has asked each of the candidates questions about their reasons for running, school finances, their vision for the district and what makes a good board member. Candidates' answers are on pages 4C, 5C and 11C in this week's edition of The Burlington Record.

In this year's Burlington school board election, this will be the first time voters will vote for board members at large instead of by districts. During the November 2010 general election, voters passed an at-large board format beginning with this year's election. For more than 50 years, each board member had represented a certain area of the school district. Burlington board member representation goes back to the 1950s when Burlington consolidated with schoolhouses in the country.

Other board members are Debbie Nider, Gary Peterson and Alan Pralle.

Police working toward solution to elementary school traffic problem

From Burlington Police Department

Crossing guards having "close calls', kids darting in and out of traffic, parents double parking and impeding traffic; these are a few of the issues Burlington police have been asked to help improve and correct.

"I know that all of our schools have issues regarding traffic", said Burlington's Chief Randy Millburn. "But when I start hearing about crossing guards getting overwhelmed with unsafe drivers and some of the descriptions of driving behavior, I get *very* concerned".

So concerned that a plan will be put in place immediately.

Burlington police will begin a 'stop-gap' program as soon as can be arranged. Officers will choose random school days to provide 'extra patrol' for the elementary school.

Millburn stressed that illegal behavior will not be tolerated and his officers will be ready to issue citations or take other action if needed.

He reported that the following issues had been brought to his attention:

•Double parking to drop kids off or pick kids up.

•Disobeying a traffic device (including a crossing guard).

•Not using the proper crossing areas.

•Stop sign violations.

•Incidents falling under 'road rage'.

"It is my hope that this will be a temporary solution until a better plan can be developed," said Millburn.

"I'm politely warning area drivers to be very aware of their driving habits all the time, but especially when they are around our schools. We're talking about our kids and grandkids here. I don't imagine my officers will have much of a sense of forgiveness regarding unsafe driving in these areas".

Community blood drive Wednesday, Oct. 19

Submitted by Sierra Roths

Since 2005 the Burlington High School's FBLA has been partnering with Bonfils Blood Center of Sterling.

The FBLA chapter now has full responsibilities with what Bonfils calls the "liaison duties," running the Burlington Community Blood Drive.

Burlington High School's FBLA invites you to come and donate on Wednesday Oct. 19, from noon to 5:30 p.m. at First St. Paul's Lutheran Church, 2669 Senter Ave., Burlington.

GIVE BLOOD GIVE LIFE

Why donate? Hundreds of patients rely on Bonfils Blood Center every day; and in about an hour you can donate a unit of blood that will save and enhance the lives of up to three patients.

Those who are 18 years and older, or are 16 or 17 with parental or guardian consent, are eligible to donate.

You must also weigh 110 pounds or greater and pass a basic heath and lifestyle screening.

Even without an appointment, you may show up and donate blood and save lives. So on behalf of the

The Goodland Star-News

WEEKEND
Friday, Oct. 7, 2011

$1

Volume 79, Number 80 10 Pages Goodland, Kansas 67735

weather report

68°
10:30 a.m.
Thursday

Today
- Sunset, 6:19 p.m.

Saturday
- Sunrise, 6:50 a.m.
- Sunset, 6:18 p.m.

Midday Conditions
- Soil temperature 66 degrees
- Humidity 61 percent
- Sky mostly sunny
- Winds south 33-44 mph
- Barometer 29.66 inches and falling
- Record High today 95° (1934)
- Record Low today 13° (1952)

Last 24 Hours*

High Wednesday	79°
Low Wednesday	55°
Precipitation	none
This month	none
Year to date	16.45
Below Normal	.85 inches

The Topside Forecast

Today: Mostly sunny with a 50 percent chance of showers and thunderstorms at night, a high near 75, winds out of the south at 15 to 30 mph and a low around 47. Saturday: Mostly cloudy with a 60 percent chance of showers and thunderstorms, a high near 59, winds out of the north at 10 mph and a low around 45.

Extended Forecast

Sunday: Partly sunny with a 30 percent chance of showers and thunderstorms, a high near 60 and a low around 44. Monday: Sunny with a high near 69 and a low around 47.

(National Weather Service)
Get 24-hour weather info. at 162.400 MHz.

local markets

10:30 a.m.

Wheat — $6.33 bushel
Posted county price — $6.37
Corn — $5.76 bushel
Posted county price — $5.68
Milo — $5.46 bushel
Soybeans — $10.39 bushel
Posted county price — $10.65
Millet — $5 hundredweight
Sunflowers
Oil current crop — $29 cwt.
Confection — no bid.
Pinto beans — $28

(Markets by Scoular Grain, Sun Opta, Frontier Ag and 21st Century Bean. These may not be closing figures.)

inside today

More local news and views from your Goodland Star-News

Cowgirls place second

Cowgirls Jazz Weis hits a shot from the fairway at the League tournament on Monday at Hugoton. Weis finished second as did the Cowgirls. See photos, story on Page 9.

Wind whipped fire engulfs truck

By Tom Betz
nt.betz@nwkansas.com

A wind whipped fire started in a wheat stubble field north of Ruleton Tuesday afternoon and before it was stopped it had burned through about two miles of stubble and the center of a corn field, and engulfed two Kanorado firemen and the newest Kanorado fire truck.

The fire was accidentally started by a crew welding a bracket on a pivot in a field about County Road 76 and County Road 9 – or where they would be if they went through – about 1:45 p.m. on Tuesday and rural fire crews from Goodland and Kanorado responded as well as mutual aid was requested from Cheyenne County and Kit Carson County.

In the path of the fire was an uninhabited home and outbuildings along with a large windbreak.

Kanorado Fire Chief David Peterson and another fireman were in the Kanorado truck trying to attack trees on fire along the west side of the fire.

"When we pulled in there was no visible fire on the south end," Peterson said on Wednesday. "We were attacking from the west where trees were burning. We had not taken many steps when we heard a roar and a boom. The cedar trees were engulfed and it was less than 10 seconds from when the first fire showed and it got to us.

"It engulfed us and we had no option but to turn tail and run. Luckily we had a safe zone to the west and we got out. We looked back and the trees and fire truck were fully engulfed."

He said they were trying to make sure the fire did not spread out, and were trying to get ahead of it after it had jumped Road 77.

On the other side of the fire Good-

See FIRE, Page 5

A firefighter checked out the burned out Kanorado fire truck on the west side of the vacant home and trees that burned as part of the damage in one of two fires the Rural Fire Departments from Kanorado and Goodland put out in the high winds on Tuesday. The fire was started accidentally by welding a bracket on a nearby pivot.

Photo by Tom Betz/The Goodland Star-News

Fire department consolidation on trial run

By Tom Betz
nt.betz@nwkansas.com

A full room of people came to the city commission meeting on Monday to hear a discussion of possible consolidation of the Goodland Rural Fire department and the city fire department.

The city commissioners agreed to a temporary arrangement where City Fire Chief Brian James would serve as the Goodland Rural Department Chief in addition to his city duties while a proposed contract is developed to allow both departments to operate together.

City Manager Doug Gerber said he felt most of the people had come to talk about the fire department cooperation issue.

He said the commissioners knew there was a vacancy for the Goodland rural fire chief, and the Rural Fire Board met last week and voted to offer the position to Brian James.

"We talked about this before and we felt we could proceed down this path because it was a personnel issue," Gerber said. "When it became reality we knew we needed to bring it to the commission for a policy decision."

He said the big question is if the commission wants to move ahead with consolidation of these two departments. He said if the decision is to proceed it will take time to get the details worked out, but he said he felt the commissioners need to focus on the key issues about the consolidation.

"I would say if the answer is 'Yes' we will work out those details," he said. "If the answer is 'No' then I speak for Brian, this is a prime opportunity and we do not want to talk about it again. We feel we ought to take the opportunity or if not put the issue to bed."

Commissioner Annette Fairbanks said the years she has been on the commission the issue has come up many times, and the timing did not seem right. This time it appears to be a great opportunity to take the next step. I have talked to a lot of people who think it is the right thing to do, she said.

County Commissioners Larry Enfield and Max Linin were present at the request of the rural fire board.

Fairbanks asked the commissioners if they felt this was a good decision.

County Commissioner Linin said the commissioners appoint the people on the fire board and feel the fire board are making the right decisions. He tried to emphasis that while the commissioners appoint the fire board it is an autonomous board with its own rules and taxing authority.

Commissioner Bill Finley said he had two questions. First was if the survey or feasibility study had

See CITY, Page 5

KBI assists in downtown standoff, arrest

By Tom Betz
nt.betz@nwkansas.com

Traffic and business in the 1200 block of Main was disrupted late Tuesday afternoon and through the night as Goodland police with the assistance of the KBI handled a standoff situation with a man who had a gun in an upstairs apartment on the corner of 13th and Main Ave.

Approximately 4:00 p.m. on Tuesday, the KBI was contacted by the Goodland Police Department requesting assistance with a barricaded subject at 1220 Main Ave.

Goodland police officers had attempted to serve a court order on the subject, Ronald Calvin Kernal, 47, earlier in the afternoon at his upstairs apartment when the subject brandished a handgun resulting in the barricade situation.

Goodland Police Sergeant Greg Krosky and officer Cody Hanson had accompanied owner, Charlene Cole to the apartment to do a welfare check and attempt to serve a court order. When the apartment door was opened Kernal was holding a gun, and Krosky backed out and called for backup.

Sherman County Sheriff's deputies Asa Stiles and Jason Showalter responded along with Wildlife Conservation Officer Mike Hooper who took up stations in the hallway and across the street at 13th to watch the back door.

The KBI High Risk Warrant Team and a negotiator, Mark Kendrick of Colby, was called in by Krosky.

Once the area was secure Krosky had the area blocked off and set up a command post at Central Elementary to await the arrival of the KBI and the negotiator.

City employees set up barricades on Main and 14th to keep the onlookers back, and Krosky asked Sherman Theatre owner David Branda to cancel the show for the night to reduce the amount of people in the immediate area.

Kyle Smith, KBI deputy director said the organization tries to provide services the local law enforcement units may not have access to. He said

The negotiator tried to talk Kernal out, but before sunrise Wednesday morning the KBI team shot tear gas through a second story window and entered the apartment. Kernal was arrested after a minor struggle. No officers were injured.

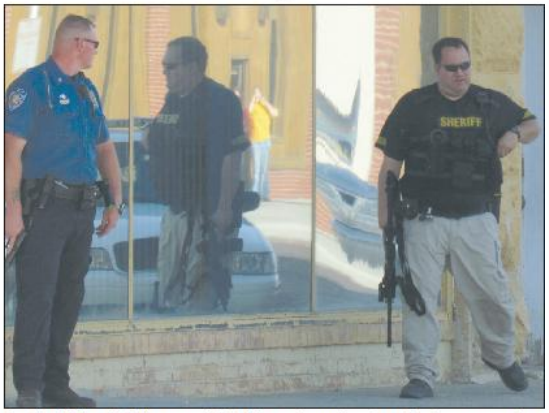
Kernal was taken to Goodland Regional Medical Center to be checked out and then booked into the Sherman County Bastille with charges of aggravated assault and $250,000 bond.

Smith said the local officers and KBI were to search the apartment on Wednesday to recover the gun or guns apparently kept by Kernal.

A check with the county attorney's office on Wednesday confirmed the search warrant had been issued and the officers had conducted a search of the apartment, but Assistant County Attorney Brock Abbey said he had not received any reports of what was found.

Goodland Police Chief Cliff Couch had to return to Tallahassee on Tuesday morning to respond to a subpoena.

Ronald Calvin Kernal was sent to prison in Sept, 1983, and released from prison in June 2002 after serving a sentence for second degree murder committed in June 1982.



Goodland Officer Cody Hanson and Sheriff Deputy Jason Showalter (above) were on watch at 1220 Main on Tuesday afternoon. The KBI tossed tear gas through the apartment window (below) to make entry early on Wednesday to arrest Ronald Kernal.

Photos by Tom Betz/The Goodland Star-News

Public flu clinic planned for Tuesday

A mass flu clinic given by the Sherman County Health Department will be from 2 to 6 p.m. on Tuesday at the Goodland Elks Loge, 1523 Arcade. The clinic is part of an emergency preparedness exercise.

People with disabilities are welcome. Everyone need to bring their insurance cards and the health department will bill them. Flu shots or nasal shots will be $25 and high-dose flu shots will be $40 for those over 65, if paid

trol has predicted that there will be no shortage of flu vaccine. The vaccine is designed for the three flu strains thought to happen during the flu season. It can also provide some protection against other strains.

The city van will be available to transport anyone from 2 to 4 p.m. Call to reserve a ride at (785) 899-5082.

If you miss the clinic appointments can be made at the health

Wind whipped flames engulf rural fire truck

FIRE, from Page 1

land Rural Fire Chief Brian James said they were told not to worry about the empty house, and when the Goodland trucks arrived on scene the house and out buildings were all ablaze.

He said they decided to turn the efforts to keeping the fire from spreading further north through the fields.

The winds were out of the south at 33 mph with gusts to 46, and the fire was pushed north by the winds. The fire men were able to stop the advance at County Road 78 to keep it from jumping into a dryland corn field.

James had been Goodland Rural Fire Chief for less than 24 hours when the fire call came in. He said at least 12 rural firemen reported to the fire, and at one time there were four trucks from Goodland Sherman County Rural, three from Kanorado, one from Cheyenne County and four from Kit Carson County.

Water tankers arrived from Sherman County Road and Bridge, Dorman Brothers and Frontier Ag.

James said four farmers with disc plows came to help. He said he was not sure who all of the farmers were, but Roger Enfield was one.

Kanorado Chief Peterson said he thought the Kears had a disc and David Leonard. He was not sure who the fourth one was.

James said he felt it all came together pretty well, and the effort made the damage as light as possible.

Chief Peterson said the Kanorado trucks stayed on scene to make sure the hot spots were out especially in the trees after the sun went down and you could see the burning spots in the trees.

He said as the trucks were returning to Kanorado the tanker ran out of fuel and they had to take some fuel out to get it back to the station. He said running fire trucks in the corn fields causes them to overheat as the radiators get plugged with the corn stalks and leaves causing some stalling problems.

With the main fire under control a second fire call came in about a fire in a field at County Road 12 and Road 57. James said the landowner helped keep the fire down by turning on his pivot sprinkler.

He said a harvester was cutting the field and the fire started in the middle. He said the best guess is static electricity was the cause of the fire.

When James and the Rural Firemen returned to town he was called out with the city firemen to standby for the standoff blocking 14th and Main.

"I got home at 4 a.m.," he said.

He agrees he got a baptism as Goodland rural fire chief.

"I think we did a good job, and was proud of the rural firemen who helped," he said. "I need people to understand I am the chief for the Goodland Rural Fire and the Goodland City fire departments. Kanorado and Brewster are separate and have their own chiefs. They help on a mutual aid basis."

He said he did not call out any Goodland city or ask for help from Brewster trucks because with the red flag warning and high winds he wanted to have them as protection for the east side of the county.

Large rural fires were reported in Wallace County, Thomas County and Cheyenne County on Tuesday.

Winds of up to 46 mph blew flames and smoke across County Road 77 north of Ruleton obscuring the unoccupied home, out buildings and trees caught in the path of the fire accidentally touched off by sparks from a crew welding a bracket on a nearby pivot sprinkler. The fire engulfed a Kanorado fire truck on the west side of the fire. Flames licked out above the corn stalks (right) in the field on the north side of Country Road 77 where the fire jumped and raced through the middle of the field before being stopped at County Road 78 before it could reach a dryland corn field. Tucks from four departments help contain and put out the fire Tuesday afternoon.

Photos by Tom Betz
The Goodland Star-News

City commissioners agree to try fire department consolidation

CITY, from Page 1

been done.

Commissioner Josh Dechant said he had talked to a man from Georgia and he did a feasibility study, but to do the full study had a pretty good price.

Gerber said the feasibility study was done last year, but it focused on station location. He said he and Darrell Cloyd of the rural fire board both did some checking on the cost for the detailed study, but felt it would be too expensive, and that did not move ahead.

Finley asked if the consolidation happens who would be the ownership of the fire protection. Is it the city, is it the fire board, is it the county the city and the fire board together.

Gerber said he felt it would be a hybrid.

Mayor John Garcia said he felt it would be good to explore the possibilities, and know there is a lot of logistics to be determined.

Garcia asked Enfield if the county commissioners were in favor of this consolidation.

Enfield said he agreed with Linin the commissioners are interested in pursuing this, and that they have appointed good people to the fire board who are making the decisions.

Garcia asked if the fire board and commissioners needed to do a workshop meeting.

Gerber said he and James had looked at an agreement between Colby and Fire District Three in Thomas County, and felt it looks like the right thing we want to do. He said under the agreement the rural fire board would continue to provide the funding. He said it would have to be rewritten a bit.

"I am in favor of moving ahead with this," Dechant said, "if you are asking us it is permissible to begin the discussion."

Gerber asked if the commissioners would like to hear from the fire board.

Rural Fire Board member Kevin Zimmerman asked if the city would like for the rural fire board to come up with a proposal.

Garcia said he thought that would be a good idea. He said they need to look at the monetary questions. He asked how much the rural fire district property tax levy raises.

County Clerk Janet Rumpel said the mill levy raises about $230,000 and that does include Kanorado and Brewster fire departments. She said it is tied to the valuation within the fire district.

Finley asked if that has been adequate in the past.

Rumpel said it has been.

"We have good fire protection and a good department," Gerber said. "We do not want to do anything to jeopardize that. I don't think it will, but we have to ask."

Talking about the fire chief duties Gerber said, "I think if James takes on this roll it will make it more difficult for him to continue to serve in the building inspector position. Brian disagrees with me. We might have to make some changes."

"I do not have a problem moving forward," Finley said, "but I do not feel we are ready to make a motion. I would like to see the proposal for the next meeting."

Garcia asked the fire board if they could have a proposal ready by the next commission meeting on Monday, Oct. 17.

Zimmerman said the rural fire board does not meet in October because of corn harvest. He said they could get it ready in November.

The question is how we handle the position until the next meeting, Gerber said.

Commissioner Chris Zimmerman said the rural fire board liked what Brian said. Give him a chance to get his feet wet and we can see what the work load is in the next few weeks.

"One question is how we cover the building inspections as well as the fire chief," Garcia said. "Tough for the commission to make a decision based on what we have. Might have to have some temporary help to see how it might work. We would expect you to give us a frank answer."

Gerber said he had put some thought to that and feel it can be done, at least on a temporary basis, and would be good time to test this.

Finley asked if the county is going to be paying some of the fire chief's salary.

"We have not had that discussion," Gerber said.

"It is a volunteer position," James said. "The chief gets paid $100 a month and for calls and training. I felt it might be difficult to come up as it is a volunteer position, and felt that might scare the fire board away."

Finley said he did not have a problem in trying it, but if will be a bit of a problem if the city has to hire someone.

Dechant said they can see what is happening and Brian will be the best determination and Doug can judge his performance.

Garcia said it sounded like everyone was in favor of trying it as a trial basis.

Gerber said he would have a proposed contract for the next meeting.

"As of tonight Brian will be Goodland Rural Fire Chief and City Fire Chief in charge of both departments," Chris Zimmerman said.

Enfield said he felt the rural fire coverage will be good as well.

James said he felt some of the rural firemen might quit without giving him a chance to prove himself. He said the city has been through this before.

"The Goodland Rural Fire Department will always have the backing of the city fire department, Kanorado and Brewster Fire Departments," he said. "I don't think all of them will quit."

"The goal is to keep all the county safe," Dechant said.

Asked how many are on the rural department Kevin Zimmerman said 17 on the county and full would be 24.

"Is there going to be a problem if there is a fire in the city and the county," Linin asked.

"I feel it can be handled," Dechant said. "We had a day where we had three fires at one time."

"The question is if there is a call can Brian respond," said Michael Dorn, a rural firefighter.

Gerber said the city would need to be careful to see the city calls are taken care of, and felt Brian would work hard to earn the trust of the rural firemen.

A question was raised about the county equipment and the current fire building.

Cloyd said the building will suffice. We do not see an issue and feel have a great deal with the assistant chief Troy Mannis.

"The fire board is not seeing it as city and county," he said, "but seeing it as community. We are trying to see it that way from Kanorado to Brewster."

Conservation award nominations sought

The committee for the Conservation Awards Program is seeking nominations for this year's Sherman County Conservation District program.

Nominations can be made by any person in the county, and should be sent to the Natural Resource Conservation Service office, 210 W. 10th, by Oct. 25.

The program is to stimulate greater interest in conservation of natural resources in the county by recognizing farmers and landowners who have made outstanding progress in establishing soil and water conservation on their farms.

Included in the awards are a soil conservation award and a windbreak award.

The program is sponsored by the agriculture committee of the Kansas Bankers Association. Committee members include board chairs of the Sunflower Extension District, Farm Service Agency, Soil Conservation District, the District Conservationist and the Agriculture Extension Agent.

Awards were presented this year at the annual Conservation District banquet to Terry and Becky Baker for their windbreak and Dwight and Judith Chipperfield for soil conservation.

Points considered in selecting soil conservation award winners include use of land based on capability, completeness of conservation plan, balance of farm enterprise, quality of conservation work and maintenance of practices and special practices unique to the farming operation.

Points considered in selecting windbreak award include providing protection from damaging winds for farm home, barns, livestock and fields. Windbreaks should be a minimum of three years old. The windbreak details include design, management, location, density and length.

For more information call the Soil Conservation District office at (785) 899-3070.

14. Appendix E – 1998 State of Kansas PM_{10} Natural Events Action Plans (NEAP) for Morton and Sedgwick Counties

STATE OF KANSAS PM_{10} NATURAL EVENTS ACTION PLANS
(NEAP)
FOR MORTON AND SEDGWICK COUNTIES

Revision 0
1 May 1998

Kansas Department of Health and Environment
Division of Environment

Bureau of Air and Radiation
Forbes Field, Building 283
Topeka, KS 66620

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FORWARD

During the first calendar quarter of 1996, high winds coupled with extremely dry soil conditions caused exceedances of the National Ambient Air Quality Standard (NAAQS) for PM_{10} (airborne particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns) then in effect. In May 1996, the United States Environmental Protection Agency (EPA) issued a Natural Events Policy memorandum to address such exceedances resulting from natural events. This policy is applicable to emissions caused by natural events since 1 January 1994. Although these events occurred prior to issuance of the policy memorandum, EPA has required, via retroactive implementation, preparation of Natural Events Action Plans for the affected areas in Kansas (i.e., Morton and Sedgwick counties).

Prior to the Natural Events Policy memorandum, natural events were treated together with other "exceptional events", and documented exceedances due to high winds were "flagged" with a "High Winds" code when submitted to the Aerometric Information Retrieval System (AIRS). Concurrence was obtained from EPA after completion of their review of documentation. For regulatory purposes, the use of flagged data associated with an exceptional event was considered on a "case-by-case" basis.

Current federal policy requires preparation and implementation of a Natural Events Action Plan (NEAP) for each area affected by naturally-caused exceedances of the NAAQS for PM_{10}. Documented exceedances due to high winds are flagged with a "High Winds" code upon submission to AIRS, and EPA concurrence is required. Subsequent to EPA concurrence, exceedances due to natural events are excluded from NAAQS attainment status determinations, provided that a NEAP is implemented within the time frame established by the policy memorandum. Failure to prepare a NEAP will result in redesignation of affected areas as nonattainment, and the State will also be required to adopt a federally-enforceable revision of its State Implementation Plan (SIP).

This document contains separate, but similar, PM_{10} Natural Events
Action Plans for Morton and Sedgwick counties in the state of Kansas. Each of these plans is a free-standing document, subject to independent review and revision. For this reason, each plan (designated as "NEAP Part I" and "NEAP Part II") includes a separate Signatures/Approvals page and its own Table of Contents.

Appendices at the end of this document contain information relevant to blowing dust (i.e., high levels of PM_{10}) associated with high wind events. This information is essential to an understanding of the frequency and magnitude of PM_{10} high wind events on the Great Plains.

A special thank you is included here for the assistance provided by Dr. Ed Skidmore and his staff at the United States Department of Agriculture - Agricultural Research Service (USDA-ARS) Wind Erosion Research Unit (WERU) located at Kansas State University (KSU). The WERU exists because there is much more to this problem than dust in the atmosphere.

PREAMBLE

During the background review of high wind events for preparation of a Natural Events Action Plan (NEAP) for Morton and Sedgwick Counties, similarities between recent events and those of the Dust Bowl era were evident. Information obtained from the United States Department of Agriculture - Agricultural Research Service (USDA-ARS) Wind Erosion Research Unit (WERU) located at Kansas State University (KSU) provides verification that events frequently occur across the Great Plains which closely resemble those which caused the Dust Bowl. These events continue to occur in spite of significant expenditures of public funds directed at their prevention.

In southwestern Kansas, as well as throughout much of the Great Plains, February, March, and April have long been referred to as "the blow months" because this period consistently brings the winds of the highest velocities. High winds in this region often begin in the latter half of January, and sometimes continue well into the month of May.

A prolonged drought, lasting from 1932 through 1938, was the basic cause of the Dust Bowl; this period is still referred to by many residents of the Great Plains as "the Dirty Thirties". Successive failures of the winter wheat crop and drought damage to vegetation on untilled land left large expanses of dry topsoil exposed. Beginning in the spring of 1932, the Dust Bowl eventually grew to encompass an area covering approximately 97 million acres, including most of the Texas and Oklahoma panhandles, northeastern New Mexico, southeastern Colorado, and southwestern Kansas. Damage extended northward as far as the Dakotas. The "blow area", where wind erosion was the worst, centered on the area between Goodwell, Oklahoma and Liberal, Kansas. By the mid-1930s, the "blow area" had expanded to include some 50 million acres, much of it in southwestern Kansas.

One of the most effective strategies employed by the federal government during and following the Dirty Thirties was removal of land from cultivation. This strategy was initially focused on tracts of "submarginal" land (i.e., land with poor crop yield potential), and was employed in southwestern Kansas. Morton County, Kansas, was the most severely damaged county in the United States during the Dust Bowl. The federal government purchased an expanse of land that was considered submarginal, but had been planted in winter wheat during the Great Depression as crop prices fell and the drought intensified. During the Dust Bowl, this land was thus deliberately taken out of production in an attempt to reestablish grassland and prevent continued wind erosion. It has been designated as the Cimarron National Grassland since 1960.

Other federal programs were initiated which actually paid farmers to take land out of production. Over the years, these programs evolved into the Conservation Reserve Program (CRP). This program offers payments to farmers for maintaining qualifying tracts of land in grass. It is no random coincidence that there are both a National Grassland and a very large allotment of CRP land in southwestern Kansas.

With the return of more normal annual precipitation and the outbreak of the Second World War, massive agricultural expansion took place during the 1940s. Drought returned in the 1950s, and so did uncontrollable blowing dust. This drought, which ended in the spring of 1957, prompted farmers in

southwestern Kansas to turn to irrigation.

Recently proposed changes in the CRP prompted the Kansas Department of Health and Environment, Bureau of Air and Radiation (KDHE/BAR), to initiate ambient air quality monitoring for particulate matter in southwestern Kansas. With the threat of CRP acreage being brought back under the plow, a special study was initiated in order to obtain background particulate data. One of the KDHE/BAR monitoring sites was located on the Cimarron National Grassland near Elkhart, in Morton County, Kansas. Another KDHE/BAR monitoring site was located near the town of Richfield, also in Morton county. An exceedance of the 24 hour PM_{10} standard occurred at the Richfield site during the "blow months" of 1996, and the U.S. Environmental Protection Agency (EPA) subsequently required filing of a NEAP for Morton County. It should be noted that the CRP was not changed as proposed, and that the special study has been discontinued until CRP land reverts to crop production.

Information provided by the WERU indicates that blowing dust was
a widespread problem across Kansas during the first quarter of 1996. This is confirmed by the information concerning drought conditions and particulate concentrations in Appendix B. Some of this dust was blown into the state from southeastern Colorado and the Oklahoma panhandle. The regional nature of these events is documented in photographs contained in Appendix A. Exceedances of the 24 hour PM_{10} standard recorded in the Wichita-Sedgwick County area in January and March (Appendix B, newspaper clippings) were also due to blowing dust, some of which blew in from northern Oklahoma. Dust clouds were observed as far away as Tuttle Creek Reservoir near Manhattan, in the northeast quadrant of Kansas. This information emphasizes that Kansas is faced with a regional problem from which a NEAP will never provide relief; localized controls alone will be of limited effectiveness in solving the problem. The regional nature of the problem of wind erosion in the Great Plains is also clearly evident in the wind erosion map which appears in Appendix C.

Wind erosion damage to the soil remains a significant problem. Over half of the 284 million acres of cropland in the United States is designated as "highly erodible" land. It is estimated that approximately 5 million acres of land are moderately to severely damaged by wind erosion annually. This amount is expected to increase if the 35 million acres of CRP land are brought back into agricultural production.

Soil conservation efforts have indeed reduced soil erosion rates across the Great Plains, but there are good years, and there are bad years. The potential for blowing dust ALWAYS exists in southwestern Kansas. Although federal agencies such as the U. S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (and their state and local implementing partnerships) are responsible for soil conservation efforts and have made significant progress over the last sixty years, no complete solution to the problem has been achieved. After soil has begun to move, virtually nothing can be done to stop it until the winds cease. This is the full-time challenge that the WERU and the entire agricultural community face, and they are better equipped to work at it than either KDHE or EPA. The wind still blows in the Dust Bowl, and when combined with drought and sparse vegetation, dust storms still occur.

STATE OF KANSAS PM_{10} NATURAL EVENTS ACTION PLAN
(NEAP)
FOR MORTON COUNTY

NEAP Part I

Revision 0
1 May 1998

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
Forbes Field, Building 283
Topeka, KS 66620

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0 SIGNATURES/APPROVALS

Originating Unit: _____ (Signature, Author)

_____

(Date)

Air Monitoring Services Section: _____ (Signature, Section Chief)

_____

(Date)

Air Planning and Assessment Section:_____
(Signature, Section Chief)

_____

(Date)

Bureau of Air and Radiation: _____
(Signature, Bureau Director)

_____

(Date)

Southwest District Office: _____
(Signature, DEA)

_____

(Date)

Division of Environment: _____
(Signature, Director)

_____

(Date)

1 INTRODUCTION

1.1 Purpose and Scope of Plan

The United States Environmental Protection Agency (EPA) and Kansas Department of Health and Environment, Bureau of Air and Radiation (KDHE/BAR), recognize that the ability to control PM_{10} (airborne particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns)is severely limited during certain natural events. In May 1996, EPA issued a Natural Events Policy to address such situations. This document has been developed in accordance with EPA's policy, and presents the Natural Events Action Plan (NEAP) for an area within the state of Kansas affected by PM_{10} exceedances of the National Ambient Air Quality Standard (NAAQS) due to natural events. The United States Environmental Protection Agency has identified three categories of natural events affecting the PM_{10} NAAQS: 1) volcanic and seismic activity, 2) wildland fires, and 3) high wind events.

Of the categories listed above, high wind events are the most probable to cause PM_{10} to exceed the NAAQS in Kansas. This plan is intended to address ambient PM_{10} concentrations in Kansas due to dust raised by unusually high winds. Such events will be considered natural events if the dust: 1) originated from nonanthropogenic sources, or 2) originated from anthropogenic sources controlled with best available control measures (BACM).

This plan has been specifically prepared in response to high wind events which occurred in Morton County, Kansas, near the town of Richfield, in January of 1996, when high winds coupled with extremely dry conditions raised dust into the atmosphere. These uncontrollable natural high wind events resulted in one exceedance of the 24-hour standard then in effect for PM_{10}. Documentation of these events is provided in Appendix B.

1.2 The 24-Hour National Ambient Air Quality Standard (NAAQS) for PM_{10}

The EPA considers the ambient air quality to be unhealthy when the 24-hour PM_{10} NAAQS is exceeded. The short-term PM_{10} NAAQS is exceeded when the 24-hour average concentration is greater than 150 micrograms per cubic meter (ug/m3). The 24-hour NAAQS is violated when the expected number of days per calendar year with a 24-hour average concentration above 150 ug/m3 is greater than 1.0, as determined by procedures described in Appendix K of 40 CFR 50.

1.3 Definition of High Winds for PM_{10} Natural Events

The definition of high winds for the purpose of this plan shall be as follows:

A daily averaged wind speed greater than 20 miles per hour (mph) or an hourly averaged wind speed greater than 25 mph or gusts greater than 40 mph with no precipitation, or only a trace of precipitation (i.e., scattered drops that do not completely wet or cover an exposed area up to a rate of 0.01 inch per

hour).*

* A general wind threshold for raising of dust is considered to be 6 meters per second, equivalent to a wind speed of 13.4 mph. The actual threshold will vary with soil type, moisture, etc.

According to the Beaufort Wind Strength Scale, a Force 4 ("Moderate Breeze") is equivalent to a wind speed of 13-18 mph. (It should be noted that average annual wind speeds in southwestern and south central Kansas fall within the range of 10 - 15 mph.) It is defined as the wind strength at which dust and paper are raised from the ground. A daily averaged wind speed of 20 mph could thus be reasonably considered to continue to raise and also maintain blowing dust in the atmosphere.

A Force 6 ("Strong Breeze") is equivalent to a wind speed of 25-31 mph. It is defined as the wind strength at which large tree branches move and open wires begin to whistle. An hourly averaged wind speed of 25 mph could be reasonably considered to continue to raise and also maintain blowing dust in the atmosphere.

2 PUBLIC EDUCATION AND NOTIFICATION

2.1 Identification of Individuals Most at Risk

The following persons are usually considered to be most at risk for adverse health effects from inhalation of airborne particulate matter, and thus comprise the target population of this plan:

1) Children;
2) elderly persons;
3) individuals with impaired pulmonary function,
    a) asthma;
    b) chronic bronchitis; and
    c) chronic obstructive pulmonary disease (COPD; i.e., emphysema);
4) individuals with cardiovascular disease; and
5) immunosuppressed persons.

2.2 Implementation of Education and Notification

The EPA Natural Events Policy requires public education concerning natural events. It also requires that the public must be informed whenever a natural event is imminent. EPA's Natural Events Policy memorandum states that the air quality is considered unhealthy whenever the 24-hour PM_{10} NAAQS is exceeded. Advance public notification concerning an imminent dust storm will require an accurate forecasting procedure. Since no such procedure is presently known to KDHE/BAR, it is not feasible to commit to such notification except through annual general notices.

In order to facilitate future implementation of a forecasting method and subsequent development and implementation of a public health advisory mechanism, EPA is encouraged to commit resources to relevant research. To promote timely development of such a system, KDHE/BAR are committed to support any organization in their request for EPA funding for relevant research, and to assist in evaluation of potential methods for applicability to dust storms affecting Kansas. Organizations interested in such research exist. Any forecasting/public health advisory system that proves to be both reliable and cost-effective will be considered by KDHE/BAR.

This NEAP addresses the following educational goals:

1) Educate the public about the harmful health effects of high concentrations of PM_{10}; and
2) Inform the public that certain types of natural events may affect the air quality of a given area.

These public education goals will be addressed on an annual basis through public service announcements. For this purpose, the Southwest District Office of KDHE (KDHE/SWDO) will issue the following statement for publication in Morton County newspapers during January of each year:

PUBLIC NOTICE
OF
POTENTIAL ADVERSE HEALTH EFFECTS ASSOCIATED
WITH ELEVATED LEVELS OF AIRBORNE DUST

On 28 January 1996, the Kansas Department of Health and Environment (KDHE) measured elevated levels of particulate matter in the air in Morton County, Kansas. Subsequent evaluation of this occurrence has been conducted by KDHE, and has clearly demonstrated the cause to be blowing dust associated with high winds and dry soil conditions.

During dry conditions in Kansas, there is a potential for blowing dust associated with high winds. The amount of particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) contained in this blowing dust may exceed the National Ambient Air Quality Standard (NAAQS) and reach levels high enough to cause adverse health effects when inhaled. Children, elderly persons, immunosuppressed persons, and individuals with impaired respiratory and/or cardiovascular function are particularly susceptible to the adverse health effects associated with inhalation of airborne particulate matter. During natural high wind events which generate high levels of airborne particulate matter, it is advisable to limit outdoor activities and remain indoors with doors and windows closed as much as possible.

During periods of blowing dust, it is also recommended that excessive physical exertion and exposure to tobacco smoke and other respiratory irritants be avoided. Persons taking regular medications are advised to ensure that they have at least a five-day supply on hand. Individuals with chronic medical conditions should consider contacting a health care provider at the onset of any of the following symptoms: headache, repeated coughing, wheezing, chest tightness or pain, difficulty in breathing, excessive phlegm production, or nausea. It is suggested that all individuals avoid vigorous outdoor activity.

This notice is applicable when local weather forecasts indicate a possibility of high winds (sustained winds above 20 miles per hour (mph) or gusts greater than 40 mph without precipitation) in the local area.

This notification is being issued by KDHE as a public service and to assure compliance with the U. S. Environmental Protection Agency's policies related to the protection of public health in areas affected by elevated levels of particulate matter due to natural events. Questions regarding this notice should be directed to the Kansas Department of Health and Environment, Southwest District Office at (316) 225-0596.

3 ABATEMENT OR MINIMIZATION OF CONTROLLABLE SOURCES OF PM_{10}

3.1 Potential Sources of PM_{10} During High Wind Events

The following have been identified as potential sources of blowing dust during high wind events in Kansas. Omission of a source from this list does not preclude its future identification as a potential source.

a) Tilled agricultural land;
b) sparsely vegetated or overgrazed range land;
c) unpaved roads and parking lots;
d) urban paved roads; and
e) construction sites

3.2 Identification and Application of Best Available Control Measures (BACM)

The Natural Events Policy issued by EPA provides for identification and application of Best Available Control Measures (BACM) to sources of soil that have been disturbed by anthropogenic activities. Determination of BACM should follow EPA's technical guidance for the determination of BACM for fugitive dust sources contained in the Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004, September 1992. These BACM will be evaluated by KDHE/BAR in consultation with KDHE/SWDO.

3.2.1 Use of conservation farming practices on agricultural lands

The following have been identified as standard soil conservation measures which constitute agricultural BACM. Omission of any soil conservation measure from this list does not preclude its evaluation and application in the future.

a) Reduced tillage farming practices;
b) tree rows;
c) other physical windbreaks;
    1) grass barriers;
    2) annual (e.g., sunflower) barriers;
    3) buffer strips; and
    4) "snow" fences;
d) cover crops;
e) strip cropping;
f) crop residues; and
g) emergency tillage

3.2.2 Abatement and suppression of dust from other sources

The following have been identified as measures which can be employed for mitigation of blowing dust from other sources. Omission of any measure from this list does not preclude its evaluation and application in the future.

a) Application of chemical dust suppressants to unpaved roads, parking lots, and open areas with exposed soil;
b) wet vacuuming of urban paved roads and parking lots;
c) dust suppression at construction sites,
    1) water spraying of exposed soil;
    2) application of chemical dust suppressants; and
    3) use of surface coverings; and
d) restriction/prohibition of off-road vehicle activities

3.3 Undefined BACM

If appropriate BACM are not defined for contributing anthropogenic sources in question, KDHE/BAR should attempt to identify specific measures for implementation. This will be accomplished in two phases, 1) identification of potential mitigating measures, and 2) initial implementation by means of pilot tests for evaluation of the effectiveness of the measures.

3.3.1 Mitigating Measures

Soil erosion specialists at the federal and state levels have been working for approximately sixty years to develop and evaluate potential mitigating measures. These soil conservation experts continue to implement measures that prove effective for the reduction or prevention of blowing dust.

Numerous measures have been applied and are currently in place across the Great Plains in order to minimize the effects of wind erosion. The United States Department of Agriculture - Agricultural Research Service (USDA-ARS) Wind Erosion Research Unit (WERU) located at Kansas State University (KSU) has achieved the following:

a) Evaluated emergency till practices and demonstrated their effectiveness in halting wind erosion as it started;
b) Evaluated vegetative and non-vegetative mulches and demonstrated that standing vegetation can be five to ten times more effective at reducing wind erosion than material laying flat;
c) Evaluated the relative effectiveness of different plant species in windbreaks;
d) Established the use of feedlot wastes as an effective method for erosion control; and
e) Established the use of permanent grass wind barriers and annual crop control strips, and

evaluated the relative effectiveness of their spacing, position, and size in reducing wind erosion.

3.3.2 Pilot Tests

Pilot testing and evaluation of experimental measures continue to be conducted by soil erosion specialists. These federally funded research efforts, which include experimental evaluation of erosion abatement, control, and prevention techniques, continue throughout the Great Plains.

3.4 Evaluation of BACM

The area south and southwest of Richfield, extending into northwestern Oklahoma and southeastern Colorado, is natural grassland and farmland, much of which is planted in wheat. During the first quarter of 1996, this area was experiencing drought conditions (Appendix B). The drought-induced decrease in vegetative cover due to dry grassland and poor germination of the winter wheat crop resulted in increased exposure of topsoil. As a result of the freezing and thawing of increasingly dry topsoil, bare areas were covered with a layer of fine loose granules (crustal dust).

It is recognized that the Richfield, Morton County area was influenced by high winds and blowing dust from the south and southwest on the day of the recorded PM_{10} exceedance. Considering the wind speeds and gusts noted during the day that the concentration above the 24-hour NAAQS was recorded (Appendix B, Table 3), it is apparent that these conditions were abnormal. The phenomena which gave rise to these blowing dust problems were, therefore, natural events which could not be prevented by application of BACM. With the top few inches of soil loose, and the lower portion frozen, the farming community was unable to apply emergency tillage or other measures to aid in the reduction of blowing dust. In fact, it is likely that these events occurred in spite of general area-wide application of accepted good agricultural soil conservation practices.

After the recorded exceedance, a fire, which had been attributed to downed power lines in the Oklahoma panhandle, spread into southwestern Kansas and destroyed vegetation across a very large expanse of CRP land. Wind erosion of soil in southwestern Kansas continued through the month of May.

On the basis of these findings, KDHE has concluded that the Richfield (population 47; 1997 Kansas estimate) area or Morton County (population 3399; 1997 Kansas estimate) could not have prevented these exceedances at the recorded particulate levels by employing localized urban control measures. The increase in PM_{10} concentration on the day of the recorded exceedance was 549% above normally observed levels. The 28 January value of 203 ug/m^3 at the monitoring site (3.25 miles north of Richfield) does not relate to the quarterly mean of 37 ug/m^3 at that site (Appendix B, Table 2).

3.5 Implementation Strategy

In view of the apparent regional nature of this problem, it seems clear that no single state agency has

the resources or regional coverage required to increase the effectiveness of established soil erosion programs. The impact of implementation of short-term, localized control measures at the state level would be negligible when faced with the combination of conditions that resulted in the elevated levels of PM_{10} described in this plan. To be effective in reducing such dust excursions at their source, a regional systems approach which includes consideration of factors such as cropping patterns, soil types, and climatological information must be implemented. KDHE will be working closely with USDA representatives in Kansas to emphasize the continued importance of regional efforts coordinated through federal, state, and local actions directed at reducing soil erosion. Concurrently, KDHE will continue to assure that the public is aware of the potential health consequences of elevated levels of airborne particulate.

4 PERIODIC REVIEW OF NATURAL EVENTS ACTION PLAN (NEAP)

This Natural Events Action Plan will be reviewed by KDHE/BAR in conjunction with KDHE/SWDO at least once in every five years. The focus of this review will be the re-evaluation of conditions causing exceedances and violations of the NAAQS for PM_{10}. The review will also consider the implementation status of the plan, as well as the adequacy of actions taken. A Periodic Review Report will be prepared by KDHE/BAR in order to summarize the findings of the review process.

STATE OF KANSAS PM_{10} NATURAL EVENTS ACTION PLAN
(NEAP)
FOR SEDGWICK COUNTY

NEAP Part II

Revision 0
1 May 1998

Kansas Department of Health and Environment
Division of Environment
Bureau of Air and Radiation
Technical Services Section
Forbes Field, Building 283
Topeka, KS 66620

TABLE OF CONTENTS

0 SIGNATURES/APPROVALS

Originating Unit: _____ (Signature, Author)

_____

(Date)

Air Monitoring Services Section: _____ (Signature, Section Chief)

_____

(Date)

Air Planning and Assessment Section:_____
(Signature, Section Chief)

_____

(Date)

Bureau of Air and Radiation: _____
(Signature, Bureau Director)

_____
(Date)

Wichita-Sedgwick County
Department of Community Health: _____
(Signature, Director)

_____ (Date)

Division of Environment: _____
(Signature, Director)

_____
(Date)

1 INTRODUCTION

1.1 Purpose and Scope of Plan

The United States Environmental Protection Agency (EPA), Wichita-Sedgwick County Department of Community Health (WSCDCH), and Kansas Department of Health and Environment, Bureau of Air and Radiation (KDHE/BAR), recognize that the ability to control PM_{10} (airborne particulate matter having a nominal aerodynamic diameter less than or equal to 10 microns)is severely limited during certain natural events. In May 1996, EPA issued a Natural Events Policy to address such situations. This document has been developed in accordance with EPA's policy, and presents the Natural Events Action Plan (NEAP) for an area within the state of Kansas affected by PM_{10} exceedances of the National Ambient Air Quality Standard (NAAQS) due to natural events. The United States Environmental Protection Agency has identified three categories of natural events affecting the PM_{10} NAAQS: 1) volcanic and seismic activity, 2) wildland fires, and 3) high wind events.

Of the categories listed above, high wind events are the most probable to cause PM_{10} to exceed the NAAQS in Kansas. This plan is intended to address ambient PM_{10} concentrations in Kansas due to dust raised by unusually high winds. Such events will be considered natural events if the dust: 1) originated from nonanthropogenic sources, or 2) originated from anthropogenic sources controlled with best available control measures (BACM).

This plan has been specifically prepared in response to high wind events which occurred in Sedgwick County, Kansas in January and March of 1996, when high winds coupled with extremely dry conditions raised dust into the atmosphere. These uncontrollable natural high wind events resulted in

exceedances of the 24-hour standard then in effect for PM_{10}. Documentation of these events is provided in Appendix B.

1.2 The 24-Hour National Ambient Air Quality Standard (NAAQS) for PM_{10}

The EPA considers the ambient air quality to be unhealthy when the 24-hour PM_{10} NAAQS is exceeded. The short-term PM_{10} NAAQS is exceeded when the 24-hour average concentration is greater than 150 micrograms per cubic meter (ug/m3). The 24-hour NAAQS is violated when the expected number of days per calendar year with a 24-hour average concentration above 150 ug/m3 is greater than 1.0, as determined by procedures described in Appendix K of 40 CFR 50.

1.3 Definition of High Winds for PM_{10} Natural Events

The definition of high winds for the purpose of this plan shall be as follows:

A daily averaged wind speed greater than 20 miles per hour (mph) or an hourly averaged wind speed greater than 25 mph or gusts greater than 40 mph with no precipitation, or only a trace of precipitation (i.e., scattered drops that do not completely wet or cover an exposed area up to a rate of 0.01 inch per hour).*

* A general wind threshold for raising of dust is considered to be 6 meters per second, equivalent to a wind speed of 13.4 mph. The actual threshold will vary with soil type, moisture, etc.

According to the Beaufort Wind Strength Scale, a Force 4 ("Moderate Breeze") is equivalent to a wind speed of 13-18 mph. (It should be noted that average annual wind speeds in southwestern and south central Kansas fall within the range of 10 - 15 mph.) It is defined as the wind strength at which dust and paper are raised from the ground. A daily averaged wind speed of 20 mph could thus be reasonably considered to continue to raise and also maintain blowing dust in the atmosphere.

A Force 6 ("Strong Breeze") is equivalent to a wind speed of 25-31 mph. It is defined as the wind strength at which large tree branches move and open wires begin to whistle. An hourly averaged wind speed of 25 mph could be reasonably considered to continue to raise and also maintain blowing dust in the atmosphere.

2 PUBLIC EDUCATION AND NOTIFICATION

2.1 Identification of Individuals Most at Risk

The following persons are usually considered to be most at risk for adverse health effects from inhalation of airborne particulate matter, and thus comprise the target population of this plan:

1) Children;
2) elderly persons;
3) individuals with impaired pulmonary function,
    a) asthma;
    b) chronic bronchitis; and
    c) chronic obstructive pulmonary disease (COPD; i.e., emphysema);
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The EPA Natural Events Policy requires public education concerning natural events. It also requires that the public must be informed whenever a natural event is imminent. EPA's Natural Events Policy memorandum states that the air quality is considered unhealthy whenever the 24-hour PM_{10} NAAQS is exceeded. Advance public notification concerning an imminent dust storm will require an accurate forecasting procedure. Since no such procedure is presently known to KDHE/BAR, it is not feasible to commit to such notification except through annual general notices.

In order to facilitate future implementation of a forecasting method and subsequent development and implementation of a public health advisory mechanism, EPA is encouraged to commit resources to relevant research. To promote timely development of such a system, KDHE/BAR are committed to support any organization in their request for EPA funding for relevant research, and to assist in evaluation of potential methods for applicability to dust storms affecting Kansas. Organizations interested in such research exist. Any forecasting/public health advisory system that proves to be both reliable and cost-effective will be considered by KDHE/BAR.

This NEAP addresses the following educational goals:

1) Educate the public about the harmful health effects of high concentrations of PM_{10}; and
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These public education goals will be addressed on an annual basis through public service announcements. For this purpose, WSCDCH will issue the following statement for publication in major newspapers during January of each year:

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On 28 January 1996 and 4 March 1996, the Kansas Department of Health and Environment (KDHE) and the Wichita-Sedgwick County Department of Community Health (WSCDCH) measured elevated levels of particulate matter in the air in Sedgwick County, Kansas. Subsequent evaluation of this occurrence has been conducted by KDHE, and has clearly demonstrated the cause to be blowing dust associated with high winds and dry soil conditions.

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This notice is applicable when local weather forecasts indicate a possibility of high winds (sustained winds above 20 miles per hour (mph) or gusts greater than 40 mph without precipitation) in the local area.

This notification is being issued by KDHE as a public service and to assure compliance with the U. S. Environmental Protection Agency's policies related to the protection of public health in areas affected by elevated levels of particulate matter due to natural events. Questions regarding this notice should be directed to the Wichita-Sedgwick County Department of Community Health at (316) 268-8302.

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The following have been identified as potential sources of blowing dust during high wind events in Kansas. Omission of a source from this list does not preclude its future identification as a potential source.

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e) construction sites

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d) restriction/prohibition of off-road vehicle activities

3.3 Undefined BACM

If appropriate BACM are not defined for contributing anthropogenic sources in question, WSCDCH should attempt to identify specific measures for implementation. This will be accomplished in two phases, 1) identification of potential mitigating measures, and 2) initial implementation by means of pilot tests for evaluation of the effectiveness of the measures.

3.3.1 Mitigating Measures

Soil erosion specialists at the federal and state levels have been working for approximately sixty years to develop and evaluate potential mitigating measures. These soil conservation experts continue to implement measures that prove effective for the reduction or prevention of blowing dust.

Numerous measures have been applied and are currently in place across the Great Plains in order to minimize the effects of wind erosion. The United States Department of Agriculture - Agricultural Research Service (USDA-ARS) Wind Erosion Research Unit (WERU) located at Kansas State University (KSU) has achieved the following:

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erosion.

3.3.2 Pilot Tests

Pilot testing and evaluation of experimental measures continue to be conducted by soil erosion specialists. These federally funded research efforts, which include experimental evaluation of erosion abatement, control, and prevention techniques, continue throughout the Great Plains.

3.4 Evaluation of BACM

The area south and southwest of Wichita, extending into northern Oklahoma, is farmland. This area was experiencing drought conditions, and the winter wheat crop had therefore not germinated, leaving bare ground in the fields. As a result of the freezing and thawing of increasingly dry topsoil, these bare areas were covered with a layer of fine loose granules (crustal dust).

It is recognized that the Sedgwick County area was influenced by high winds and blowing dust from the south and southwest. Considering the wind speeds and gusts noted during the days that concentrations above the 24-hour NAAQS were recorded (Appendix B, Table 3), it is apparent that these conditions were abnormal. The phenomena which gave rise to these blowing dust problems were, therefore, natural events which could not be prevented by application of BACM. With the top few inches of soil loose, and the lower portion frozen, the farming community was unable to apply emergency tillage or other measures to aid in the reduction of blowing dust. In fact, it is likely that these events occurred in spite of general area-wide application of accepted good agricultural soil conservation practices.

On the basis of these findings, KDHE has concluded that the Wichita area could not have prevented these exceedances at the recorded particulate levels by employing localized urban control measures. The increases in PM_{10} concentrations ranged from 634% to 1238% above normally observed levels. For example, the 28 January value of 184 ug/m^3 at the George Washington Blvd. site does not relate to the quarterly mean of 29 ug/m^3 at that site. The 28 January value of 359 ug/m^3 at the Coleman Co. site also does not relate to that site's quarterly mean of 29 ug/m^3 (Appendix B, Table 2).

3.5 Implementation Strategy

In view of the apparent regional nature of this problem, it seems clear that no single state agency has the resources or regional coverage required to increase the effectiveness of established soil erosion programs. The impact of implementation of short-term, localized control measures at the state level would be negligible when faced with the combination of conditions that resulted in the elevated levels of PM_{10} described in this plan. To be effective in reducing such dust excursions at their source, a regional systems approach which includes consideration of factors such as cropping patterns, soil types,

and climatological information must be implemented. KDHE will be working closely with USDA representatives in Kansas to emphasize the continued importance of regional efforts coordinated through federal, state, and local actions directed at reducing soil erosion. Concurrently, KDHE will continue to assure that the public is aware of the potential health consequences of elevated levels of airborne particulate.

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SUMMARY

The Dust Bowl was a regional problem that required intervention at the national level. There are federal agencies (and their corresponding state and local partners) with decades of experience in dealing with wind erosion of soil. Soil loss rates are much lower than they were during the Dirty Thirties, but these can be grossly elevated by high wind events during periods of drought.

The United States Department of Agriculture - Agricultural Research Service (USDA-ARS) and Natural Resources Conservation Service (USDA-NRCS) study land use, assess the condition of land, and, with the assistance of state and local agricultural agencies and organizations, develop and apply conservation measures to prevent soil loss. In Kansas, wind erosion concerns are being addressed, in part, through the USDA-NRCS Environmental Quality Incentives Program (EQIP). Morton County falls within a designated priority area (i.e., the three southwestern counties of Kansas) for which special erosion control contracts lasting three to five years have been developed. Through continued efforts, such programs have significantly reduced the annual impact of wind erosion of soil.

In light of the regional nature of blowing dust across the Plains States and the long-term federally-coordinated commitment to the problem, it would be inappropriate to create a new independent state-level authority to address this problem. No individual state has authorities or resources to implement a regional project of this nature. Application of short-term, localized control measures alone at the state level would have little or no measurable effect. Specialists in the field of agricultural wind erosion continue to emphasize that a regional systems approach which includes consideration of cropping patterns, soil types, climatological information, and other factors is required.

Only a truly regional approach coordinated at the federal level can have significant impact on events of this type that vary from state to state and have broad geographic implications. Existing federal efforts might be well-served by additional involvement in these programs on the part of EPA along with affected states as stakeholders. Funding from EPA for USDA-ARS research and USDA-NRCS application efforts (and their state and local implementing partners) could prove highly beneficial in accelerating improvements in air quality related to high wind events.

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1. Code of Federal Regulations, Title 40, Part 50 (40 CFR 50), Appendix K.

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